

The project approach specifics in relation to the student self-organisation development

Natalja V Dyorina¹, Petr Yu Romanov^{2,*}, and Georgy V Tokmazov³

¹ Institute for Humanities Education, Nosov Magnitogorsk State Technical University, 38 Lenin Ave., Magnitogorsk, 455000, Russian Federation

² Institute of Natural Science and Standardization, Nosov Magnitogorsk State Technical University, 38 Lenin Ave., Magnitogorsk, 455000, Russian Federation

³ Admiral Ushakov Maritime State University, 93 Lenin Ave., Novorossiysk, 353924, Russian Federation

Abstract. The study is based on the concept of shaping students' self-organisation in the digital learning environment of a technical university. The recommendations for creating an effective learning system can be used in the creation of effective education systems. They will be created through the use of digital technologies in the educational process of the university to create a culture of self-organization of students. According to these provisions, the author of the work should identify the characteristics of educational activities and ensure their effective implementation during the formation of the culture of students of a technical university. Scientific research on students' self-organization culture formation will be carried out considering the specifics of students' interaction and information environment of the university. The direction of the project approach in pedagogy is "pedagogical planning". The authors have identified the stages of pedagogical planning necessary for successful implementation of the project methodology and the problem under the study. They are necessary in the formation process of university students' self-organization culture. To conduct the research, it is necessary to determine the way in which the ability to create a culture of self-organization in the digital educational environment of a technical university can be developed. The authors have set a goal to provide students with the opportunity to realize their creative potential, to form self-organization. To enable students to design projects independently, the authors suggest that they show their autonomy in designing. They plan means to organize an effective learning process and ensure its effectiveness, which in modern conditions is possible through the introduction of digital technologies in the educational process of the university to create self-organization of students. The article describes technological methods of students' self-organization culture formation in the conditions of digital educational environment of a technical university, namely, project technologies, which are based on the relationship of a teacher and a group.

1 Introduction

When selecting methodological approaches, it is important to consider the overall direction of the whole study, to identify all the main points: highlighting the structure of the object under study or the application of pedagogical technologies; defining the process factor under study, its content; highlighting the process features or innovative pedagogical technologies. The availability of approaches acts as a theoretical and methodological basis for the study. They form the basis of the pedagogical concept of the students' self-organization culture formation in the conditions of digital educational environment of a technical university, which aims to develop self-awareness abilities. The system of the terminological apparatus, which allows establishing the specificity and properties of the research subject, has not been studied before. Applying the chosen approach, the general regularities, principles of formation of cultural self-organization of technical university students are determined. It is also possible to design a promising

direction for the development of further research on this issue. E.V. Gnatyshina [1], L. Mokhova [2] believe that an integrated approach to methodology is a guarantee of complete research, ensuring the adequacy of the means applied in solving the indicated tasks.

The project approach is attributed the role of practice-oriented tactics within the framework of our research. The analysis of the problem of formation of student self-organization culture when using digital educational technologies of a technical university is conditioned by the direct implementation of the process of creating social organization of students in the digital information-pedagogical environment of the university, which provides the interaction between students and the information environment of the university. On the basis of this dialogue it is necessary to approach the question taking into account the specifics of this interaction. The consistency of the scientific approach to research involves the development of research methodology, taking into account the specifics of pedagogical

* Corresponding author: Romanov-magu@mail.ru

interaction in the process of formation of students' self-organization culture at a technical university.

M. Kagan [3], A.S. Makarenko [4], I.V. Pritychenko [5] developed various aspects of project activities as part of pedagogical research. J. K. Jones [6], Z. Zhirkova [7], I. A. Kolesnikova et al. [8] have developed the theoretical foundations of pedagogical design and created a theory of learning. From the position of A.S. Makarenko [4], pedagogical methodology as a science consists in creating "scientific projects of personality"; the functions of teachers-practitioners consist in drawing up and implementing educational programmes based on the general project considering individual characteristics of an individual [4, p. 14]. Based on the knowledge about educational systems, design is the transition from knowing about them to creating their normative models to translate the project into the field of education. Many researchers are convinced that implementation of the project approach is based on "representation (image) of the future activity result".

Project-based learning is seen as an individual activity that students limit themselves to in space or time to obtain the final product of an activity to solve certain problems.

In the process of project implementation, the student reveals his or her personal characteristics and develops creativity and intellectual abilities while working on the project and contributes to increasing interest in learning activities.

Students form groups to solve specific problems. Each project participant has a mentor (project manager) as well as a project manager. His or her task is to manage the process as well as to stimulate and explore together with the students the objects or tasks in the specific project. The final product of this work is a patent, a report, a book, an innovation or an analytical report. A business plan can be developed on the basis of these products. This is why the question of whether the product of a project development can be successfully commercialised is important.

In spite of this, projects and project-based learning cannot completely replace traditional lectures on theory or learning practices.

According to the Russian Ministry of Education and Science, the main purpose of projects is to improve the quality of education and bring its content in line with market requirements. Students must be integrated into the projects in order to solve the problem of graduates finding jobs in their specialities. To solve this problem, according to the RF Ministry of Science and Higher Education, it is necessary to involve business specialists in project teams.

The choice of project depends on the level of knowledge of the students and the field of study. For students and graduates, more complex projects are offered which will generate profits in the future. As the undergraduate and graduate courses progress, projects aimed at consolidating knowledge and learning to work together have begun to appear.

Each activity begins with finding an idea, then a project plan is developed and organised. Then the planned project activities are planned for the future; after

that, a presentation of the projects is created for discussion in the forum.

The second step is to set up a problem that the project team investigates. Thus, the tutor needs to choose such a learning topic and get the students interested [9].

At the end of the first stage, the project team should define the purpose of the project. In the second stage, the work schedule and the schedule of meetings with the members of the working group are agreed upon.

Within the project, the teams work according to the plan.

At the end of the stage, the team prepares a presentation and analyses the results of the joint work. Next is the implementation phase. In agreement with the university administration, the final product may be presented at an academic, grant or professional competition and then commercialised.

Project participants are generally not subject to traditional university requirements, which in turn allow large groups of young researchers to take advantage of all the opportunities for information and research. The paradigms of many fields of knowledge now make use of networked ontologies and digital platforms [9]. Modern approaches enable learners to immediately immerse themselves in solving real large-scale problems with experts in many fields, breaking down interdisciplinary and sectorial barriers [9].

According to E. Purgina [10], T.N. Zhukov [11], A.O. Grudzinsky [12], the project approach involves organizing an effective learning process, which in modern conditions is built by implementing digital technologies in all educational processes of the university to form a culture of students' self-organization.

2 Materials and Methods

One of the most important activities of the project approach in pedagogy is 'pedagogical planning'. To date, there are different aspects of this phenomenon, which are investigated in different directions. A. Dakhin [13], G.L. Ilyin [14], and E. Schwarzkopf, V. Svinarenko [15] and other researchers distinguish the following interpretations of the concept "pedagogical planning" in relation to our study: project, pedagogical model of training; training in the process of designing (designing). Based on the analysis of scientific sources, the following definition of pedagogical planning is relevant for us: creating a model of planned future processes or phenomena and moving from knowledge about pedagogical systems to creating their normative models. At the same time, this process of designing and constructing a project sets the limits to the depth of problem solving in the future.

I.V. Pritychenko [5] believes that the project is inseparable from prediction and design. All these phenomena are endowed with common characteristics: predicting future educational processes. Modern education pays more attention to the project because it is aimed at acquiring knowledge and skills required for further practical work.

In V.V. Serikov's [16] the learning systems are represented by the following components: diagnostics and forecasting, using modelling methods and each of these stages is a separate pedagogical activity, which includes performance goals and control. Pedagogical activities are distinguished by their own management system, which includes: goal-setting, planning, task execution.

With a project-based approach, it is possible to identify the characteristics of educational activities and ensure their effectiveness in the formation of student self-organization culture within the digital environment of a technical university. Let us name the main characteristics of educational activities in higher education institution within the project approach. 1) The project is aimed at solving a certain problem. 2) The project result is intended for mass use (production); 3) the designer's activity is based on the values that are created by the project implementation. 4) The design process is systematic; 5) in traditional and pedagogical design, some reality object is modelled.

The results of the study have shown that in the implementation of pedagogical design it is possible to identify the stages of university students' learning and identify their importance for successful formation of student's self-organization culture. This process takes place in the process of project development or design intention, as well as construction.

Here the regularities between the phenomena of reality are used.

L. Tondl, I. Peisha [17] point out that the quality of project development depends on the observance of two conditions: 1) the project should meet the needs of consumers and be physically executable; 2) the authors of the project need to reproduce a certain set of means (mapping in documentation, description verbally, etc.).

Designing includes all types of engineering work: from preliminary sketches to technical specifications and working drawings. The overall level of design is the main indicator to be considered when preparing a design for production. Indicators are needed for the design stage of the project and for planning the manufacturing process throughout.

The final stage of design development is the creation of prototypes, which may then undergo additional modifications to adapt to mass production (circulation). The designer should not make any changes that go beyond the model he or she has created. The pedagogical field is characterised by the lack of a common understanding of the conceptual category of pedagogical design. The study of pedagogical design can be seen as an element of the learning process and cognitive activity.

Therefore due to the complex experimental design, fundamentally new forms of pedagogical process organization (pedagogical community), corresponding school educational activity and training are created during active "growing" of new forms of emotional and moral community of teachers, students or their parents, as V.A. Bolotov, E.I. Isaev, V.I. Slobodchikov, N.A. Shaydenko explain [18].

Project activity is a complex of different innovative technologies and ideas in modern education, intercultural

socio-pedagogical movement and educational systems (E. Egorov, A. Anisenko, Y. Burlakova, N. Bykova [19], E.V. Bondarevskaya [20]).

3 Results and Discussion

At both conceptual and content-meaning levels, pedagogical design is carried out in terms of organization, curricula, research processes, State Standards. From the point of view of this study, the levels of designing correspond to the level of interaction between the level of designing and the level of relationships [5]. There the culture of students' self-organization is formed: information level (content of all kinds of information about projects: research or teaching), emotional level, norms and rules of behaviour during project implementation, ethics of the participants' actions of work on the project.

As a rule, students feel the need to demonstrate their independence ("self") at the design stage: at the project development stage, when participants have to define their idea of themselves and the object of design, to express their point of view in an argument with peers or adults.

In order to achieve the goals and values in the learning process, the student must consider the interests of others in order to find the causes of difficulties and problems they have encountered in the past. Also through communication, they can act together and correct their actions based on feedback, as well as, in the evaluation of their actions and the result obtained.

The principles necessary for project implementation can be formulated as follows

- the result is the most important (this principle is a core element of the project approach and expresses the strengthening of the target management stage. Specific objectives are used for design, which can be translated into a vision of the outputs of the system in question and further - converted into a defined sequence of actions. The main points are that the objectives must be achievable, although at the same time they can be positioned towards some kind of ideal. This principle indicates that it is the objective that determines the way all management functions are carried out: planning analysis, organisation of accounting, etc.);
- the main purpose is to concentrate all the functions of self-organisation: analysis (planning), organisation and control;
- predictability (this principle implies future-oriented management. Several circumstances follow from this. In fact, this principle emphasises the special role of forecasting and planning elements of management in the university, indicates the need to make management decisions considering those external environment conditions that are expected in the time perspective.

This principle fixes a more or less long-time interval required to achieve the set goals. The results of the

project activities in the university cannot be achieved instantly, but are reflected after a certain period of time);

- the principle of organisational authority applies to all aspects of the organisation's activities (this principle involves shaping the project as a management entity, which includes all activities to fulfil certain objectives. This method involves isolating all activities to fulfil a certain goal. Everything that is not related to the activities that are carried out as part of the project is an external environment);
- the principle of segregation of duties; to implement this principle there is a special body (which can be an entity or a group) which is responsible for the whole project;
- the principle of a comprehensive approach to project evaluation, according to this principle, it is necessary to broadly cover the problems and analyse the various indicators of the project. Each factor is important for the purposes of the project.
- the principle of balance. The principle of balance is based on the principle of balance between needs and opportunities. When implementing a project, the purpose, the timeframe for the project, and the actions of the implementers must be considered. But this principle also requires a balance between the project and the external environment.
- the basis of optimum behaviour. It is defined as the principle that one should look for optimal solutions and do so with all the details of the project in mind.

The technologies and methods of students' self-organization culture formation in the conditions of digital educational environment of a technical university have been defined on the basis of the project approach. Projects imply the application of technologies of interaction between a teacher and a group of teachers with a group of students or with a single student. This set of technologies can be applied, for example, in the design of a traditional educational institution or in the conditions of digital transformation of an educational institution [5]. According to C. Campbell, M. Campbell [21], N.V. Bystrova, O.V. Panfilova et al. [22], project technologies make it possible to establish pedagogical interaction in order to form a tolerant attitude to social differences in the society of people, as I. G. Shendrik mentions [23], who know the basics of project activities, who can understand the social significance of future activities.

4 Conclusion

When implementing the project approach in the process of formation of student's self-organization culture in digital educational environment of technical university, general provisions from its practical application such as a concept, tactics of conducted research are used and stated below.

One of the main components of pedagogical design is the scientific and methodological mechanism of organization and implementation of learning innovative projects, which includes forecasting, intellectual

modeling, and analytical evaluation. We consider these structural components as the most essential and a necessary component of the student's learning self-organization.

The inclusion of digital educational technologies in the educational process of a technical university implies increasing the level of self-organization culture in the digital educational environment of a technical university through gradual delegation of non-virtual electronic resources of the university in order to involve the student in organizing and managing the process of self-organization culture formation, as well as involving students in an active process of goal-setting.

Creation of educational situations for students in which they can maximally develop and demonstrate their creative abilities, realise their potential to form a higher level of self-organisation culture (L.I. Savva, N.Y. Saigushev, O.A. Vedeneeva, N.V. Derina et al. [24], [25]).

The structural components of project activity allow us to determine the composition of the most optimal combination of the pedagogical design process. The main goals of the project act as ideal for technological design and educators, they should be achieved directly in the development process. As a rule, the main object of pedagogical design is the pedagogical education system itself or the learning process. The designer is a student or a team of students who are its active participants.

The main way of creating and effective functioning of modern pedagogical information system in digital educational environment of technical university is to develop and apply normative legal documents which describe creation/penetration of new forms of education, creation or functioning of educational processes with varying degrees of accuracy (L.I. Savva, L.A. Savelieva, E.G. Chigintseva, N.M. Makarova, A.Yu. Chernyaeva, M.N. Komissarova [26]). However, it should be taken into account that designing includes specific requirements which must be met for each learner or teacher.

Designing includes social, psychological and technical-technological aspects. Socio-cultural, psychological-pedagogical and technical aspects are necessarily involved and directly interlinked in pedagogical instructional design [27]. The compatibility of these two or more aspects lies in the harmonious ability to simultaneously work in a team, take full responsibility for decision-making and the ability to analyse and evaluate the results of one's work.

Independent pedagogical design has a subject-subjective character: students' right and responsibility for their own actions; ability to choose independently the most effective ways of realising their own creative potential, giving students the opportunity to realise their own creative potential. As students perform a variety of learning activities within design, they constantly interact with other participants in the process and coexist harmoniously together, interacting with them. Moreover, students themselves become independent subjects of scientific knowledge, creative activity and intercultural communication, master specific personal roles of an author or performer, set their own tasks (ask questions

and form experience for future education), and transform the educational environment and themselves according to their visions for the future in order to effectively form self-organization culture.

The study of student's self-organization culture in digital learning space of a technical university from the perspective of the project approach provides an opportunity to correctly identify the main subjects of personal psychological and educational interaction, establish their internal structure and individual characteristics, stages, highlight the most important provisions to ensure effective project activity.

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