

Review Article

**CONTENTS OF WORK OF STUDENT SCIENTIFIC CIRCLE ON THE BASIS OF
TECHNICAL UNIVERSITY**

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Abstract.

The article presents in detail that the activities of the student scientific circle orient the student's potential towards professional, intellectual and social creativity, providing conditions for self-education. Indeed, the institutions of higher technical education have the task of training highly qualified graduates who are thoughtful, competent, independent. To form the required competencies of a modern engineer, the integration of science and education is necessary. The main vector of development of modern pedagogy is aimed at the development and implementation of new, more effective teaching methods. The basis for the development of new techniques and teaching methods is the development of the student's mental abilities, allowing him, with a certain amount of knowledge, to navigate independently in the world of science and technology, to master new knowledge. The paper gives examples of research directions of students in a scientific circle on the example of the Surgut branch of the Tyumen Industrial University.

Keywords: student scientific circle, questionnaire. Education, testing, research hypothesis.

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INTRODUCTION

The Tyumen Industrial University is positioned as a research university, which, in addition to providing educational services, requires the development of research skills. In the cycle of socio-humanitarian disciplines, this work usually comes down to work with scientific literature and journalism, because, unlike research in the field of engineering and technology, there is no laboratory base. In this regard, in the Surgut Institute of Oil and Gas, new forms of organizing the scientific work of students were found - conducting sociological research. This work has been carried out over the years, dozens of surveys on youth problems have been conducted, on the basis of which extensive information has been received about the most diverse aspects of the life of the student team of the branch. The research topic was related to attitudes towards studies, future professions, sports, military service, politics and elections. The problems of employment of graduates, the structure of free time, problems of a young family, commitment to bad habits, student self-government, etc. were also studied. Since the contingent of the branch acted as an object of study, the information obtained as a result of research on different aspects of the life of students can be useful for organizing the educational work of the unit.

I must say that the idea of organizing a circle did not come immediately. Initially, the methodology of conducting sociological research had to be thoroughly mastered in the process of preparing students for participation in sociological olympiads. The program of the Olympiad included a theoretical section - blocks of tests on the history and theory of sociology - and a creative task on the methodology and technique of conducting a sociological study. Participants were asked in a short time to develop a program and research tools on a given topic. The necessary elements of the program were the formulation of the problem, object and subject of research; setting goals and objectives; development of the conceptual apparatus of the study - theoretical and empirical interpretation (structural and factorial), as well as the development of research tools (logical diagram of the questionnaire, the presentation of different types of scales, etc.). Successful appearances on the rounds of the Intellect 2008 Olympiad in Tyumen suggested the use of the accumulated material more widely. The subject "Sociology and Political Science" at that time was taught in the third year to students of all specialties in the amount of 34 hours. The tasks for

developing the CSI program (a specific case study) were first taken by the most successful students, but the circle of people who wanted to complete such a project was gradually expanded. In the process of work, the practice of using group projects has developed - several people dealt with one topic. Groups (usually 2-3 people) were formed at will. Surveys were conducted among classmates. Further, the results of the research were reported at seminars, and the most successful presentations were selected for revision in order to participate in scientific conferences. An additional incentive for research was the introduction of ongoing certification in the educational process and the use of a point system to assess the quality of academic performance.

In connection with the increase in the number of participants in the project, there was a need for methodological support for the research. Initially, guidelines for compiling a program and conducting sociological research were prepared for bachelors, and in 2014 a training manual was published. It should be noted that work was carried out at different levels of complexity. Initially, these were simple pilot studies, then more and more descriptive works began to appear, sometimes with elements of analytics. Surveys conducted on the eve of the presidential elections, elections to the State Duma and local self-government bodies with the aim of forecasting the percentage of students and staff at polling stations have become trendy.

The sociological research circle was formed after the subject "Sociology and Political Science" was taken out of the curriculum for bachelors in the areas of "Oil and Gas Business" and "Operation of Transport and Technological Machines and Complexes" - the areas in which training is being conducted in the Surgut branch of the Tyumen Industrial University.

METHODOLOGY

Let us consider in more detail the organization of work of a student scientific circle for conducting sociological research. The first lesson, as a rule, is organizational in nature. It is very important that it does not take place formally, but brings maximum benefit. The main task is to interest the audience, instill confidence in success. To this end, it is useful to acquaint recruits with the previous achievements of the members of the circle: to give an overview of the studies, to show slides of presentations at scientific conferences, to offer to scroll through

collections of published articles. Such information is always of lively interest, as there are familiar faces everywhere. As an example, the first lesson usually considered a report on conducting a sociological study on the topic "Students' attitude to the educational process" - for this work, student of the group NDb-09 Anna Mayer received a 1st degree diploma in the section "social and humanitarian disciplines" at a student research competition in Tyumen, dedicated to the 100th anniversary of V.I. Muravlenko.

It is important to emphasize right away that the preparation and conduct of research will be based on the principles of cooperation. This means that you need to take the initiative, try to independently solve the tasks. Work in a circle gives everyone the opportunity to fully demonstrate their intellectual and organizational abilities. It is immediately stipulated that the task of the leader is not to dictate, but to guide and help. Of course, for this it is necessary to create a friendly atmosphere in the team, where every person is respected and any opinion is accepted.

At the first meeting, in addition to choosing a headman, it is necessary to form working groups of 2-3 people. Since the process is voluntary, this issue is referred to the headman. The composition of groups at first may vary somewhat.

The next important point in the organizational lesson is the distribution of sociological research topics. Participants are offered a choice of an approximate list of ongoing research on youth issues, but at the same time it remains an opportunity to take a topic of interest in addition to the list. By the next meeting, each group is invited to decide on this issue and start searching for publications on its topic.

Based on the fact that bachelors of technical specialties do not have experience working with literature on sociology, it is necessary to orient them in this direction. First of all, you should familiarize yourself with the periodicals, where the results of scientific research are published, as well as develop the skills of searching for the necessary articles. Since our library has published the Sotsis magazines for several years, it has become a practice to bring a selection of magazines to the circle. In order to search for publications on their topic, someone started flipping through the pages, more experienced browsing the table of contents, but almost no one knew that in the last issue there was a complete index of articles for the whole year. Further, only issues of magazines No. 12 remained in the work, the rest were put aside. Familiarization began first with the headings of the journal, and then with a list of publications for the year for each. The greatest interest was shown, as a rule, to headings on the problems of youth, education, religion, culture. Having found out in which issue the necessary article is located, then it was easily found in one of the deferred copies. After reviewing the latest issues of the journals over several years, you can make a good selection of articles for your research. This is a good practice, because the acquired skills will find application in the future, including when searching for literature via the Internet. In addition to Sotsis, it was recommended to draw information in the publications of the journal *Izvestiya Vysshikh Uchebnykh Zavedenii RF. Sociology. Politics. Economics* "of our base university, for this it is enough to go to the TIU website. What is especially valuable, many articles of this scientific journal contain statistical data on the West Siberian region.

At the first meeting, the participants of the circle are set the main goals and objectives and determine the amount of work to be performed:

1. conducting research and reporting results in the classroom;
2. preparing a presentation and making a presentation at a scientific conference;
3. preparing a scientific article for publication.

Participants are entitled to complete work at any stage. But, as experience shows, most people prefer to speak with the results of research at a conference and publish. There is an additional incentive for this - replenishment of the personal portfolio for the purpose of entering the magistracy.

Another organizational point is the determination of the timing of the preparation of tools for research, scheduling surveys, reporting, etc. Time for each stage is planned depending on the date of the conference. It is required to find the best option for each working group in order to prepare a report on the work done in advance and to be able to calmly prepare a report for the presentation. But, unfortunately, not all novice researchers fit into the established time frame.

Thus, in the first lesson, several important tasks of the preparatory phase are solved, including both organizational aspects and training on the research methodology:

- a) common goals are determined, participants are motivated to conduct sociological research;
- b) election of the headman of the circle and the formation of research groups;
- c) research topics are being formed;
- d) scheduled work schedules;
- e) the necessary recommendations are given for the selection and study of literature.

As mentioned above, the great difficulty in organizing the work of the circle is the ratio of the study of theoretical material and the implementation of practical tasks for specific sociological research (CSI). It would be tempting to first state all the necessary information in lectures, and then distribute the topics of CSI among working groups and conduct individual consultations during the research. But in this case, at the initial stage of work, a large amount of information falls upon the consciousness of the listeners, which is difficult to perceive, and, as experience shows, with each subsequent lesson the number of those present in the audience becomes thinner. With this approach, there is a risk of losing part of the contingent, since participation in conducting sociological research is voluntary. A different path has been chosen. The volume of theoretical information was given in small blocks, and in parallel in each group the corresponding practical problems on the topic under study were solved. For example, if the content of the methodological section was considered, then after familiarizing themselves with its structure, the participants in the working groups described the problem situation, formulated goals and objectives, determined the object and subject of the study on their topic. At each stage of work on the CSI, examples from previous studies were necessarily considered, since completing tasks by analogy greatly simplifies the tasks facing beginning sociologists.

The algorithm of work for each section of the CSI was as follows:

- presentation of theoretical material;
- acquaintance with examples of similar tasks in previous studies;
- work in groups on this section of the CSI on their topic;
- discussion of the results of work performed by one or more groups;
- correction of texts based on the discussion, taking into account the mistakes made (independent work in groups on their own topics);
- control, a detailed discussion of the results of work on the topic (individual lessons of the leader with each working group).

The most important and difficult part of the preparatory phase is the development of a sociological research program. In its structure there are two main sections: methodological and methodological. The methodological section includes the formulation of the problem and the justification of its relevance; definition of the object and subject of research; setting goals and objectives of the study; theoretical, empirical and operational interpretation of concepts; hypothesis. Each of these stages has its own peculiarities, at each stage of work special requirements are made, but you must always remember that the program as a whole is an organic system, where all elements must be logically connected.

Work on a sociological research program begins with the formulation of the problem. It should reflect social facts that attract the attention of public opinion and require their study

and resolution. For example, a low percentage of voter turnout. It is desirable that the problem be close and interesting to the authors - in this case, the work will go enthusiastically. Sometimes the proposed research topic seems uninteresting at first glance, but if you think together, in what aspects it can be considered, what problems to open, it becomes attractive and relevant in the eyes of researchers.

Much attention was paid to the quality of the wording in the classes: they should be clear, concise and comprehensive. To achieve this, different tricks were used:

1. Texts were distributed with examples of cumbersome vague wordings, and the task was to simplify the presentation, to find the best option.
2. Examples with new unfamiliar terms were considered, the task was to find their meaning in dictionaries or reference books and give a laconic interpretation in the context of the context.
3. The groups were given an arbitrarily chosen topic and the task was to formulate the problem, goals and objectives of the study. Then the best option was chosen.

A mandatory requirement in the design of a sociological research program was the use of the scientific style of the language. This also concerned the formulation of the name of the study. Sometimes funny situations happened. For example, two sophomore girls chose the behavior of drivers and pedestrians on the roads as the subject of research. A lot of work was done: more than a hundred people were interviewed, statistics on traffic violations were collected, an analysis of violations of the rules by drivers and pedestrians of different age groups was made. All work was carried out in accordance with the schedule. But somewhere they met the article "Serious drivers and poor pedestrians, or a suffering driver and evil grandmothers," and they liked this name so much that it was decided to head their own research in the same way. It was very hard to convince them to change their name. In the end, it was still possible to agree, and the conference program included a report entitled "The situation on the roads of the city of Surgut through the eyes of drivers and pedestrians."

The last stage of the methodological section is the hypothesis. A hypothesis is an assumption in which preliminary explanations are formulated, a forecast of expected results is given. How

many hypotheses should be, and how to formulate? We recall again that the program of sociological research is a complex logical system. In formulating hypotheses, one should return to the original tasks in order not to miss anything. If the task is posed, then an answer must be given to it. But so far we can make only some assumptions, which are based on our experience, observations, some facts, etc. Hypotheses set the direction for research. Indeed, when the researcher has a "clean field", that is, there is no data on the basis of which certain conclusions can be drawn, the hypotheses act as "milestones" that set the direction for research. To check them, you need to choose the appropriate research methods, for example - questionnaires. If this is a survey, then to confirm or refute each hypothesis, it is necessary to draw up a block of questions in the questionnaire.

RESULTS

As the completion of the questionnaire was completed, the research groups began preparing the questionnaire. At this stage, it was necessary to solve a number of organizational issues: to prepare the required number of forms, draw up a schedule for the questionnaire according to the schedule of the groups, and arrange with the teachers to allow them to take 10-15 minutes of time. Duplication of questionnaires was partially carried out at the department, but mainly parents and friends helped. A brief introductory speech was prepared, and, if necessary, a briefing.

Filled out questionnaires were collected (there were practically no spoiled forms to be rejected), and the work proceeded to the final stage.

Processing of primary sociological information was carried out manually: questionnaires were laid out in the audience on the tables and calculations were made for each position. The results obtained were recorded on a blank application form. For this, the total number of choices for this position (absolute values) and the result as a percentage of the total number of respondents were entered on the right opposite the answers. An example of processing the results of the primary data processing is given below in the table:

Table 1 ProfileThe attitude of students to the educational process

1) How often do you prepare for training sessions? 1. Regularly 2. Almost always 3. I prepare, but rarely 4. I am not preparing for classes at all.	5 (20%) 10 (50%) 4 (25%) 1 (5%)
2) How carefully do you prepare for training sessions? 1. I prepare all the material in detail 2. I prepare everything in general terms 3. I am preparing partially 4. I do not prepare, I hope for luck	7 (35%) 8 (40%) 4 (25%) 1 (5%)
3) Do you pass the certification on time? 1. Always rent on time 2. I try to pass on time 3. It rarely turns out to be delivered on time 4. I rent later	12 (60%) 6 (30%) 2 (10%) -

In fact, each position of the questionnaire (1), 2), 3) is a one-dimensional table, and in total we get detailed statistics for a separate group. The report in a separate file was attached with the completed questionnaire forms, which excluded the possibility of juggling the results. Such a fairly simple method allows you to systematize primary sociological information and

present the results of the study in a visual form for further analysis and interpretation of the data.

At the next stage, the results of surveys of all groups of the first year, then the second and third, respectively, were summarized. The results obtained were placed in summary table 2.

Table 2 The attitude of students to the educational process

Question in the questionnaire	Number of respondents (%)			
	I course	II course	III course	Averages
1) How often do you prepare for training sessions? 1. Regularly 2. Almost always 3. I prepare, but rarely 4. I don't prepare at all	10 (23,8%) 19 (45,2%) 11 (26,2%) 2 (4,8%)	6 (13,3%) 23 (51,1%) 16 (35,6%) -	9 (22%) 17 (41,5%) 13 (31,8%) 2 (4,9%)	25 (19,5%) 59 (46,1%) 40 (31,3%) 4 (3,1%)
2) How carefully do you prepare for training sessions? 1. I study all the material in detail 2. I look through everything in general terms 3. I am preparing partially 4. I do not prepare, I hope for luck	6 (14,3%) 24 (57,1%) 9 (21,4%) 3 (7,1%)	4 (8,9%) 28 (62,2%) 11 (24,4%) 2 (4,4%)	6 (14,6%) 17 (41,5%) 12 (29,3%) 6 (14,6%)	16 (12,5%) 69 (53,9%) 32 (25%) 11 (8,6%)
3) Do you pass the certification on time? 1. Always rent on time 2. I try to pass on time 3. It rarely turns out to be delivered on time 4. I rent later	14 (33,3%) 22 (52,4%) 6 (14,3%) -	8 (17,8%) 29 (64,4%) 7 (15,%) -	15 (36,6%) 18 (43,9%) 6 (14,6%) -	37 (28,9%) 69 (53,9%) 19 (14,8%) -
		1 (2,2%)	2 (4,9%)	3 (2,3%)

The statistics contained in the tables can be interpreted in different ways: to compare indicators of different courses and groups, to track the dynamics of changes in the results, to identify their interdependence, and so on. In any scientific work, they will act as strong arguments in support of the author's position.

In the classroom workshops, workshops on conducting sociometric studies and Brainstorming were organized. The choice of these methods is not accidental: it is due to the fact that the acquired skills can be useful in the future scientific and professional activities of graduates of the institute. For example, the data obtained as a result of a sociometric survey will help the young leader better understand the structure of relationships in the team entrusted to him. Information about the presence of individual substructures, situational leaders, and conflict relationships allows you to make informed management decisions. The brainstorming method helps in the search for innovative solutions in unusual situations. This kind of knowledge can find application in a wide variety of fields of scientific and labor activity.

In the classroom, to intensify the work of the group, the Brainstorming method developed by the American psychologist A. Osborne to stimulate creative activity was occasionally used. For example, in the course of joint work on the questionnaire, the discussion proceeds very sluggishly. New questions are offered by a couple of people, the rest are not involved. One of the reasons is that not all of those present decide to express their ideas. In this case, to create an atmosphere of free discussion, it is useful to introduce an element of the game.

First you need to distribute the roles and explain the basic rules. Brainstorming (attack) involves groups of "idea generators" and "analysts". The task of the first is to put forward as many new original ideas as possible, therefore it is preferable to include people with a good imagination, competent and decisive in this group. A group of analysts performs two functions: it criticizes controversial issues and selects rational proposals. The formation of groups can be carried out at the request of the participants. The same person can combine different roles, that is, first act as a generator of ideas, and then perform the functions of an analyst.

A secretary is immediately selected from a group of analysts who should record all the proposals. You can write them on the

board, but it is better to use a computer for this and display the text on the screen.

The success of the brainstorming session is largely dependent on the leader, as he organizes the entire discussion. Initially, this role is usually played by the teacher, but in the future it can be replaced by students - leaders with organizational skills. However, this requires special training: the leader must be competent throughout the range of issues discussed, direct the discussion in the right direction, maintain the "tone" of the game, and make decisions promptly.

The process of brainstorming (attack) is divided into several stages:

1. Setting goals, introducing participants to the basic rules for brainstorming. In order to eliminate psychological stress, it is useful to carry out a "warm-up" - for example, to suggest inventing options for using an object (pens, scarf, etc.).

2 stage. A group of generators puts forward ideas, the secretary records them (without specifying the authors) on a board or screen. First, everyone takes part in turn (in a circle), and after the group joins the work - at will. The task of the leader is to achieve a continuous "flow of ideas." If the discussion has begun to decline, to activate it, you can try to "throw in" new ideas that allow you to continue working in another direction. It is welcome if participants "pick up" and develop interesting proposals, combine different options.

The basic rules for participation at the stage of generating ideas are as follows:

- no skeptical remarks should be made - the leader should stop all attempts to start a discussion;
 - you must try to put forward as many new ideas as possible, and the more unusual a new thought is, the better;
 - Statements should be clear and concise;
- for each speech, only one thought can be expressed, one proposal can be made.

3. After the completion of the generation stage, discussion and criticism of the ideas put forward begin, and constructive proposals are selected and finalized.

This technique was used in the classroom in various cases: during the hypothesis, to search for the wording of the goal and objectives of the study, etc.

It is important to emphasize that the method of "brainstorming" has a very wide application, since "collective intelligence" contains much greater potential than the mind of an individual person (the principle of holism). This method is very effectively used to search for innovative solutions in various fields of activity, including in the field of design and operation of equipment. Thus, students can use the experience acquired in the classroom in future professional activities.

To confirm the heuristic value of unexpected, unusual ideas that arise on the basis of free associations, the following story can be cited as an example: American military engineers during the Second World War for a long time searched for ways to deal with torpedoes. During the break of one of the grueling meetings, the participants went out to breathe, and one of them drew attention to the fact that water jets deviate to the side of the ship's hull. It was at this moment that the idea came to find a similar method of deflecting the trajectory of torpedoes. The rest was a matter of technology. In the history of the development of science, there are many similar examples.

CONCLUSIONS

Since each graduate at the end of a higher education institution is employed by a manufacturing enterprise, research institute or other organization, he must, in addition to professional knowledge, have the skills to work in a team. It is no secret that young specialists with communicative skills are moving up the career ladder much more successfully than their former classmates who had a higher academic performance rating. One of the collisions of education is that in the process of obtaining knowledge, the student is only responsible for himself, whereas in an enterprise the indicators of the team as a whole depend on the quality of its activity. In this sense, in the process of research, working in a group on a project allows you to acquire the necessary teamwork skills, where the result is achieved by joint efforts, and therefore everyone is interested in the success of colleagues.

Classes and painstaking work on the CSI were not in vain. The participants gained positive experience, which was useful in study and, we hope, will be useful in future professional activities. We note some positive points:

1. Classes in the circle contributed to improving the quality of knowledge. This is evidenced by the fact that at the FEPO in sociology, students who participated in the work of the circle on questions related to research methods and the structure of the program of doubts never arose.
2. The skills acquired in the process of conducting sociological research were useful for preparing the final qualifying work, since the requirements for the methodological part of the sociological research program and the requirements for the corresponding section of the WRC are largely the same. This, in particular, was discussed in a conversation with graduates of the NDb-09 group, who took an active part in research for two years. The whole narrative is not given here in its entirety, but it is understood that they did not experience difficulties in working on the methodological section, and even advised classmates on a number of issues.
3. The knowledge gained in the process of conducting sociological research (especially the methodological part) was useful for the preparation of scientific papers in other fields of knowledge.
4. The skills of public speaking were acquired, which had a positive effect on the defense of graduation qualification work.
5. Skills in preparing articles for publication have been acquired.

In organizing the work of the circle, a number of innovative methods were used: the basis of the research behavior was the project method of training: specific sociological research (CSI) performed by students can be classified as a type of group research projects; there was an individually-oriented learning model: students chose the topic of CSI independently, the type and level of complexity of the study was planned depending on the abilities and capabilities of the participants in each group; implemented a subject-subject model of learning, where the

teacher and student become equal partners in the educational process; An innovative synchronous-asynchronous model for organizing the educational process was applied, where, along with general activities, individual consultations with groups on CSI topics occupied 50% of the time; the methods of problematic teaching were used: students, based on their own scientific interests, chose a research topic, a work plan was outlined with the leader, and then the research groups gradually realized the plan on their own.

Attracting students to research work allows you to use their potential to solve pressing problems in various fields of science and technology. It should be borne in mind that the motivation for research at different stages of education (bachelor's, master's and postgraduate) is different. There is a tendency to a gradual change of goals from individual (gaining new knowledge and skills, extra points, forming a portfolio) to socially significant ones: participation in the development of innovative projects, prospects in the profession, raising the rating of the university. Such innovative activities should be encouraged, as the experience gained will undoubtedly find worthy application in future professional activities.

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