SOCIAL PSYCHOLOGY

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Sociometry of the study group in mutual self-education

This paper elaborates the structure of the study group in mutual self-education. The study of the author's self-education model combining synergy and traditional pedagogy is in progress. A situation of constructive chaos is created with a view to start the properties of self-education inherent in every living thing. We give an electronic resource on the course to students. We keep an electronic register on training. We use Moreno's sociometry and questioning. By means of individual questioning we succeeded in identifying the structure of the study group in mutual self-education. We have constructed a sociogram of mutual learning, through which the leaders of self-education are revealed. By the end of training the number of leaders has increased, that describes the sustainability of self-development processes.

Keywords: *sociometry, mutual self-education, questioning, sociogram, self-education leaders.*

In this paper we continue the investigation of the self-education model [2–4], unifying the principles of traditional pedagogy and the principles of the system approach and synergetic: self-organization, self-management, self-education. Besides the principles of synergetic, in the author's self-education model they use highly effective methods of learning based on mutual self-education [1]. From the first lesson the teacher explains the essence of self-organization and self-education in the classroom and creates a situation of constructive chaos in a group [3]. Students are given tasks, electronic resource and permission to communicate with the teacher after hours. Each student chooses a path of his/her studies of many possible: students learn the subject as it is convenient for them. Due to the situation of constructive chaos in a group it is spontaneously formed a "self-education island" and the whole group gets a new quality – there is always one or more students who start to develop their own theoretical course and perform tasks of meta-projects [4]. Most students also do not want to drop behind the leaders of self-education. Not everyone succeed in this; so they have to work independently and also to resort to the help of the teacher and his/her fellow students. It is not nothing but mutual self-education. The latter is much more efficient, because the "teacher-student" barrier disappears. At mutual self-education there are activated some hidden reserves of a human brain which we have not been adequately investigated. The result shows that they perform difficult tasks of a meta-project; eventually the whole group studies and makes progress more intensively.

The purpose of the research is to try to explore mutual relations in a group by the methods of sociometry and to see how it affects the process of mutual learning.

The research problem is to investigate the possibilities of sociometric methods for studying the processes of mutual learning; alternatively, for the same purpose to carry out the research by individual questioning.

The sociometric techniques, developed by J. Moreno [6], are used for diagnostics of interpersonal and inter-group relations in order to change, improve and perfect them. Using sociometry one can study the typology of social behavior in a group activity, judge the social and psychological compatibility among specific groups. However, the book of J. Moreno is rare and cumbersome procedures of data processing lead to the fact that sociometric studies are rarely used. A sociometric procedure may have the following purposes:

a) measuring of the degree of cohesion, disunity within the group;
b) identification of a "sociometric position", i.e., a correlative authority of members after signs of sympathy, antipathy, where "the leader" of the group and "the rejected" are at opposite poles;
c) detection of intra-group subsystems, cohesive formations, headed by their own informal leaders.

The sociometric technique is performed by a group method. Its implementation is not time-consuming (15 min.)

Chooser	**The chosen one**																								**The number of votes**		

Fig. 1. The individual sociometric card

In this paper we study the learning process of students of F-13 group; they have mastered quite a difficult subject "Basics of video and multimedia learning tools" [5]. We kept an electronic register during the whole semester. The exam on the subject was also created in a situation of constructive chaos and the students performed the task in the meta-project form. The exam was held in the computer lab. Before the examination, the post-graduate student Barannik N.S. has spent sociometry, which took less than 10 minutes. In our study, we use a nonparametric procedure in which the respondent is asked to answer the question of a sociometric card without restriction of choice, "Is it pleasant or unpleasant for you to live and interact with this member of the academic group?" In Fig. 1 shows an example of sociometric cards. Near each of name of group members in a cell that is in the same line with a participant's name ("Who chooses the") one should put "+" with a positive choice, "0"

when a choice is neutral or "-" for a negative choice, depending on their relation to a group member. In the cell opposite to his/her surname, each participant enters the sign of "x".

This initial, experimentally determined information is entered along the row into the cells of the matrix C2-AB2 (Fig. 2). Once the results of the individual sociometric table of a last participant are introduced, in the columns of the pre-programmed spreadsheet AC-AM there appear the desired results, and in the cell B27 one cam see Igr index of group cohesion, which can range from -0.5 to + 0.5. Figure 2 shows a group sociometric table. Let us give some explanations for this pattern. They distinguish personal and group sociometric indices [6]. The first are characterized by individual socio-psychological characteristics of a person as a group member. The latter provide complete numerical characteristics of sociometric configuration within the group. They describe the properties of communication group structures. The symbols i and j represent the same person, but in different roles; i – selected, j – selecting, ij – combining roles. Let us give the definitions of some indices [6].

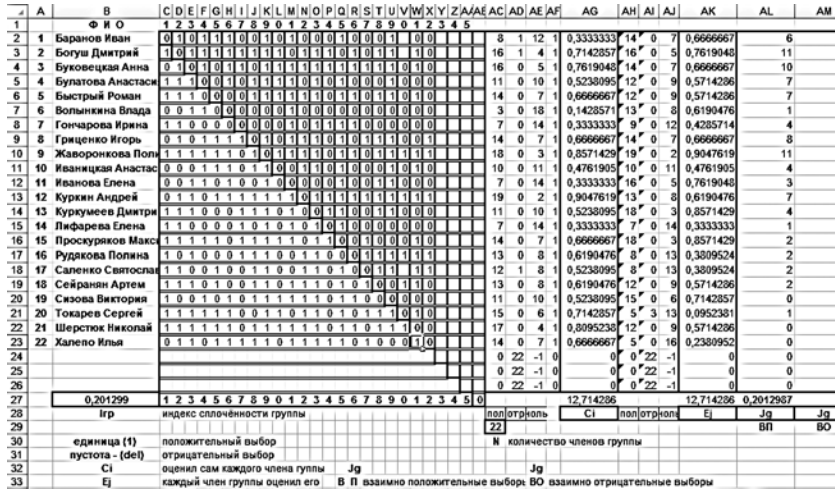

Fig. 2. The sociometric group table

The sociometric status index of i-group member is given by:

$$C_i = \frac{\sum_{i=1}^{N} (R_i^+ + R_i^-)}{N-1}, \qquad (1)$$

where Ci is a sociometric status of i-group member, R+ and R- - the elections received by i-member, Σ - a sign of the algebraic sum of the elections received by i-member, N - the number of the members of the group.

The index of emotional expansiveness of j-group member is given by:

$$E_i = \frac{\sum_{i=1}^{N} (R_j^+ + R_j^-)}{N-1}, \quad (2)$$

where Ej is emotional expansiveness of j- group member, Rj - the elections made by a member (+, -). From a psychological point of view, the expansive index characterizes the need for communication.

The index of "group solidarity" (Igr) is given by:

$$I_{zp} = \frac{\sum_{ij=1}^{N} (\sum_{ij=1}^{N} A_{ij}^+) - \sum^{N} (\sum_{ij=1}^{N} A_{ij}^-)}{N-1}, \quad (3)$$

where - mutually positive choices in the group; – mutually negative choices in the group.

As can be seen from Fig. 2, the leaders by likes and dislikes are identified in the group. But these leaders refer indirectly to the processes of self-education and mutual self-education. One of shortcomings of the nonparametric procedure is a great probability of getting a random selection. Some subjects, guided by personal motives, have often written in the questionnaire: "I choose everyone". It is clearly, such an answer can only have two explanations: either the interrogated really have such an amorphous and undifferentiated generalized system of relationships with others (but it is unlikely), or the subject wittingly gives a false answer, using formal loyalty to others and to the experimenter as a cover (it is most likely). The analysis of these cases has led some researchers to try to change the very procedure of the method and thus to reduce the chance of random selection. Thus the second option was born – the parametric procedures with the limited number of choices. The subject is asked to choose a strictly fixed number of group members. For example, in a group of 25 people everyone is asked to choose only 4 or 5 people. The value of the number of sociometric choice limiting is called "sociometric restrictions" or "the limit of elections".

After sociometry almost all students began to perform examination tasks at the same time. Figure 3 shows an exam ticket pattern.

In carrying out a practical task students were allowed to use their own computers and also the computers of the institute, to communicate and help each other (mutual self-education), to access the Internet (on their computers). Task performance had no time limits. At the exam the teacher was assisted by a post-graduate student who found out from students who had already passed the exam, who helped them during the semester, and at the exam. According to this questioning the sociogram was constructed. Half of students at the examination carried out the task in 60 minutes, the rest took a little more time. Four students who worked successfully during the semester have received an automatic exam as a bonus.

In Fig. 4 there is a graph showing the dynamic of performance of examination tasks. The vertical axis shows the time to complete. The computer fixed the time when

the file was saved. The horizontal axis shows the number of the student, passing the exam, which does not coincide with the number of this student in the group list.

Examination Card # 8

OSV Multimedia OS
(discipline name)

first-year, undergraduate studies,
"Technology"
specialization (year, department)

1. What is reference in electronic editions? What are formats of video data?
2 . Carry out the practical task on the computer:

Work with one of the selected and coordinated with the teacher interactive program. Take a picture of the screen of the computer and record in a format of avi. the process of task performance. Create and cut a small video clip (add titles: who, what, by what programs did the work. Add titles with explanations of own actions. Add a melody).

File name. **Task, full name.avi.**

It is possible to take the software and used multimedia information (text, images, audio, video, etc.) from an electronic resource.

Fig. 3. The exam ticket pattern

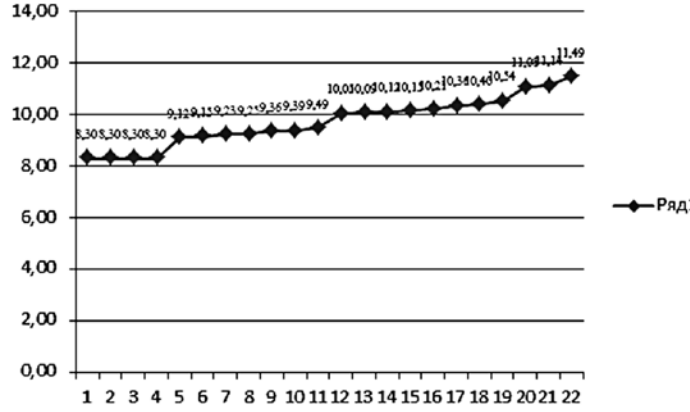

Fig. 4. The dynamics of performance of examination tasks

In Fig. 5 there is an electronic register on training on the course. At the exam the group has received 10 excellent and 12 good marks. All practical tasks were interesting and original; the pedagogue has saved them in students' folders on the course. Students performed examination tasks in conditions close to reality with which they are likely to face in life.

The results of questioning after the examination were more informative than sociometry; these results underlie the construction of the sociogram of mutual learning, as it is shown in Fig. 6. We have identified the main leader of self-education – Kurkumeev Dmitri, who was noted in the electronic register as a leader in self-education on the course at the end of the semester. As one can see from the sociogram, the most part of students use mutual self-study, getting help from the main leader of self-education, and provide assistance to other students, in the role of leaders. In is important that being in a role of leader - that is, teachers, students develop the ability to teach others. For a pedagogical institute of higher education it is a valuable asset; it is developed through mutual self-training from the first semester of the first year. Therefore it would be appropriate to extend the application of mutual self-education by other teachers in studying other subjects of the curriculum. Then by the end of their studies at the university, most students' skills of mutual education would be skills of professional activity. These skills will be useful in upbringing of own children.

№	ФИО	Задание 1	Задание 2	Задание 3	Задание 4	Задание 5	Задание 6	Задание 7	Экзамен
1	Бирюков Илья Вячеславович	22.09.12	22.09.12	23.11.12	20.11.12	23.11.12	29.11.12	15.12.12	25.01.13 Отлично
2	Богуш Дмитрий Николаевич	21.09.12	09.10.12	09.11.12	29.11.12	23.11.12	11.12.12? 15.12.12	25.12.12	25.01.13 Хорошо
3	Буховецкая Анна Сергеевна	11.09.12	15.09.12?	22.09.12	12.10.12?	20.11.12	30.11.12	07.12.12? 25.12.12	25.01.13 Хорошо
4	Булатова Анастасия Сергеевна	11.09.12	06.10.12	27.11.12	01.12.12	01.12.12	25.12.12? 27.12.12	05.01.13	25.01.13 Хорошо
5	Быстрай Роман Андреевич	11.09.12	25.09.12	15.09.12	13.11.12? 20.11.12	30.10.12	25.12.12	27.12.12? 28.12.12	25.12.13 Хорошо
6	Волынкина Влада Владимировна	11.09.12	06.10.12	01.12.12	01.12.12	04.12.12	25.01.13	05.01.13	25.01.13 Хорошо
7	Гончарова Ирина Александровна	11.09.12	09.10.12	09.10.12	01.12.12	01.12.12? 11.12.12	15.12.12	25.12.12	25.01.13 Хорошо
8	Гришко Игорь Владимирович	11.09.12	22.09.12? 06.10.12	12.10.12	30.11.12	06.11.12	30.11.12	30.11.12? 01.12.12	25.01.13 Отлично
9	Жихоренкова Полина Игоревна	15.09.12	15.09.12	21.09.12? 25.09.12	13.11.12	25.09.12	01.12.12	25.12.12	25.01.13 Отлично
10	Ильницкая Анастасия Александровна	15.09.12	09.10.12	12.10.12	16.10.12	01.12.12?	15.12.12	25.12.12 25.12.12	25.01.13 Отлично
11	Ишкова Елена Владимировна	15.09.12	15.09.12	02.10.12	09.10.12	06.11.12	30.11.12	07.12.12? 11.12.12	25.01.13 Отлично
12	Курнин Андрей Михайлович	22.09.12	01.12.12	01.12.12? 04.12.12	01.12.12	30.11.12	14.01.13	14.01.13	25.01.13 Отлично
13	Куркумеев Дмитрий Валентинович	05.09.12	11.09.12	11.09.12	06.11.12	06.11.12	05.09.12	04.12.12	25.01.13 Отлично
14	Лифарева Елена Владимировна	05.10.12	05.10.12? 12.10.12	05.10.12? 12.10.12	04.12.12	04.12.12? 15.12.12	04.12.12? 15.12.12	15.12.12	25.01.13 Хорошо
15	Проскуряков Максим Игоревич	15.09.12	25.09.12	20.11.12	01.12.12	01.12.12	15.12.12	25.12.12	25.01.13 Отлично
16	Рудакова Полина Юрьевна	25.09.12	25.09.12	16.10.12	30.11.12	30.11.12?	14.01.13	14.01.13	25.01.13 Хорошо
17	Салнико Святослав Владимирович	22.09.12	22.09.12	15.12.12	15.12.12	15.12.12	15.12.12	15.12.12	25.01.13 хорошо
18	Сейдаки Артём Арменович	22.09.12	16.11.12? 11.12.12	30.11.12	16.11.12	30.11.12	11.12.12	05.01.13	25.01.13 Отлично
19	Сисова Виктория Олеговна	11.09.12	11.09.12	11.09.12	22.09.12	22.09.12	22.09.12	04.12.12	25.01.13 Отлично
20	Токарь Сергей Сергеевич	22.09.12	09.11.12	27.11.12	29.12.12	04.12.12? 05.01.13	05.01.13	05.01.13	25.01.13 Хорошо
21	Хадыко Илья Иванович	15.09.12	04.12.12? 15.12.12?	04.12.12? 15.12.12	04.12.12	15.12.12? 25.01.13	04.12.12	21.12.12? 14.01.13	25.01.13 хорошо
22	Шерстюк Николай Анатольевич	15.09.12	15.09.12	12.10.12	30.11.12	04.11.12	25.12.12	10.01.13	25.01.13 Хорошо

Fig. 5. The electronic register on training

Comparing the sociogram and the electronic register on training, we can say that the number of self-education leaders has increased. According to the e-register during the semester there were four leaders of self-education highlighted in the electronic register on training in Fig. 5. At examination there were revealed nine leaders of self-education that characterizes the stability of self-education and self-development processes.

Summary

1. Carrying out sociometric researches in the study group has revealed that students' individual questioning immediately after the exam was more informative. The questioning results enabled us to construct the sociogram documenting the process of mutual education in a group.
2. The launched at the beginning of training process by the teacher of the processes of self-development and self-education are stable; the growing number of self-education leaders speaks about it.
3. The dynamics of the examination task performance (Figure 4) shows that examination tasks are performed much faster at mutual self-education. The teacher does not "look for and extort" the traces of knowledge from students, but states the fulfillment of rather a complicated task. Students demonstrate not only theoretical knowledge, but mastery of practical skills of knowledge use, i.e. the acquired habits.
4. It is desirable to extend the mutual self-education application by other teachers in studying other subjects of the curriculum.

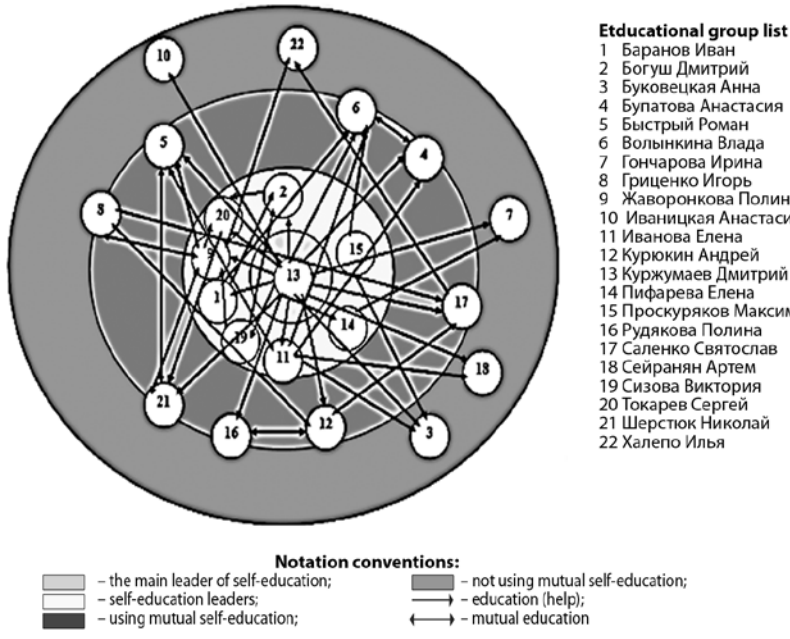

Fig. 6. The mutual education sociogram

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