

Collaborative Learning: How Teachers Use Thinking in Educational Practice

Besarion Meskhi

Don State Technical University

Rostov-on-Don, Russian Federation

Svetlana Ponomareva

Don State Technical University

Rostov-on-Don, Russian Federation

Alla Belousova*

Don State Technical University

Rostov-on-Don, Russian Federation

Abstract-This article presents the results of comparative analysis research devoted to the empirical study's organization peculiarities of the collaborative teachers' thinking activity in the educational process. The research is based on the understanding of the collaborative teachers' thinking activity, which represents a combination of different functions: generation, selection, sense transfer and implementation. The author's scheme was used for the research purpose to monitor the interaction between teachers and students. The scheme of observation included several blocks illustrating the peculiarities of the collaborative thinking activity functions' realization. The research involved 108 teachers, who work at different schools of Rostov-on-Don. The article represents the peculiarities of teacher's collaborative thinking activity. It is illustrated that there are significant differences in the way of scheme's blocks presentation. It is marked that the most prominent is the organization of interaction and sense transfer block. Sense transfer is considered as one of the main psychological mechanisms included in the educational activity, the essence is the exchange of senses and the formation of common senses in the educational process.

Keywords-collaborative learning, collaborative thinking activity, initiative, organization of interaction cooperation, sense transfer, senses, assessing, practical

I. INTRODUCTION

Due to the development of innovative processes, which are caused, first of all, by the introduction of information, education has begun to change. It is necessary to modernize education, because social requirements are transformed into the necessity to do it. It means that we should imply the use of innovative teaching methods aimed to increase the innovative capacities of students, their readiness to perceive innovation and implement innovative behavior.

Currently, the main characteristics of innovative learning technologies have been formed. They possessing the following peculiarities, they are: activation of students' behavior and thinking; compulsory interaction of students with each other and with the teacher; high degree of students' involvement in the educational process.

The principle of direct participation is the basis of innovative methods. The mentioned principle allows to make each student an active participant of the educational process. It creates opportunities for students to go beyond the limits of individual experiences. In addition, this principle mobilizes

students' willingness to perceive and generate new information in the context of discussion.

At present, the idea of collaborative learning is being actively developed (P. Dillenbourg, M. Baker, A. Blaye & C. O'Malley [1]; RJ Lam [2]), in the concepts of joint construction of knowledge (M. Scardamalia & C. Bereiter [3]; G. Singh, L. Hawkins & G. Whymark [4]), group cognition (G. Stahl [5]). The concept of sharing knowledge is viewed as a social process of computer support for collaborative learning (L. Lipponen [6]; G. Stahl [7]).

Collaborative learning refers to innovative methods, which meet these requirements. They are based on the modeling of collaborative thinking activity. That is, the interactive methods stimulate the initiation of thinking, the development of intellectual and personal potential of students, the capacity of self-realization, as well as the interaction of students with each other, and a high level of their involvement in the educational process. These methods are dialogical in nature. Collaborative discussion of problems, mutual dialogical thinking of students creates conditions to find out contradictions, the initiation of thinking, the formation of psychological and personal growth.

The accent on the organization of the collaborative thinking activity was made when the Federal State Standards in Russia were introduced during 2011-2012. These standards were the basis of general and secondary general educational systems. The development of these systems was connected with the implementation of various forms of innovative education, critical thinking technologies, project methods, interactive teaching methods. The theoretical and methodological basis of the standard are based on the system-activity approach of such famous researches as V. V. Davydov, A. N. Leontyev, D. B. Elkonin. These approaches imply the development of the subjective position of learners, the formation of their personal, metasubject and subject results of educational program mastering. When we speak about it, we mean the basic general education and secondary general education. The conditions for organizing various forms of collaborative activity (group methods of interaction, work in pairs, etc.), which innovative teaching methods are built on, fully create conditions for the development of subjectivity, the formation of readiness and ability to develop and improve themselves, and at last the development of creativity and the capacity for personal self-realization.

We assume that the learning process promotes and develops the world image, and that the teacher's role is to be a mediator, who introduces the world of culture to students. The learner actively creates his or her own world image, but this process is carried out with the help of a teacher and other adults in various types of activities, which form the basis of a learner's life. Education serves as a collaborative activity of teacher and learners, during which, through the mediation of a teacher, learners create their own world image. In our opinion, the most adequate form of creating the world image is the organization of various collaborative activity forms. A teacher, engaging in communication with learners, carries out collaborative thinking activity with them, which is connected with the search and discovery of something new, unknown, controversial. Just the thinking collaboration of learners with their teacher and learners with each other, contributes to the integration of information into the learners' world image. All these conditions most fully correspond to the social nature of knowledge, because they model, to a certain extent, the situations of socially developed knowledge.

Understanding of all these things leads us to the need to study the psychological mechanisms that form collaborative thinking activities. Earlier we published the concept of the functional nature of collaborative thinking activity [8]. Developing L.S. Vygotsky's concepts about the social and functional structure of higher mental functions [9], we have identified four functions through the implementation of which the collaborative thinking activity is realized. These functions are generations, selections, sense transfer, and implementation.

The first function, which structures collaborative thinking activity, is the generation function that involves initiation of thinking. It includes the processes of reflection and attempts of participants to resolve cognitive contradictions, which are expressed in the formation of goals, new meanings, motives, assessments and other new formations of thinking activity. The next step in the implementation of the collaborative thinking activity system is related to the function of selection—that is the selection and assessment of assumptions, hypotheses, activities and personalities of the participants. The suggested assumptions and hypotheses are not yet obligatory for other participants to accept them. Therefore, the function of sense transfer is distinguished. The aim of this function is to transfer the hypotheses, assumptions and their meanings and also to implement the participants' integration on their bases. The functions of sustainability and the implementation of actual problem solving should be carried out with the help of implementation function, which includes the processes of achieving the formulated goals, hypotheses and assumptions. The importance of this function is in the fact that it completes the decision-making process and the ideas' realization in the real transformations.

The key processes of the collaborative thinking activity mechanisms are sense transferring ones. The function of

sense transfer is like a core, fundamental basis by means of which all collaborative thinking activities exist. When a person interacts with the world (which includes other people) and forms the image of the world, it is essential for him to interact with the corresponding, identical opposites [10]. It is necessary for the realization of the collaborative thinking activity. In other words, the collaboration will take place when the senses of the participants are relevant. It means that people, in this case, deal with one common sense space, where and when their senses partially cross, coincide, become common, forming the common space. We called this fact a "common psychological situation". In order to form such a collaborative thinking space, which is the base for interaction and development of collaborative activity, it is necessary to transfer the sense. It is necessary for the transfer of the partners' individual senses. Thus, it is extremely important for cooperation of people to form common senses, and to implement the function of sense transfer in general. The teacher is the guide and mediator of the world human values and culture in the emerging human world. Teacher gives the notion about the world's culture, socio-cultural experience and a developing person to learners. Teacher creates a general psychological situation for learners, only in which it is possible to interact. This situation implies that learners absorb the values and senses of the teacher and they will link with their own senses. This is possible if a teacher with the help of all available means tries to transfer the importance of the experience he has got to all learners.

Within the framework of solving various scientific problems related to the sense reality, the problem of sense transfer is constantly developing in the experimental studies of various scientists, they are A.K. Belousova [8], A.K. Belousova, E.A. Suroyedova [11], G.P. Hodgkinson, P.R. Sparrow [12], V.I. Kabrin [13], L.C. Kagermazova [14], V.E. Klochko, E.V., Galazhinsky [10], D.A. Leontiev [15], E.A. Suroedova [16]. According to the researcher A.K. Belousova [8], E.A. Suroedova [16] the sense transfer, in the collaborative thinking activity, is carried out in meanings, through the argumentation system and emotional means, by the expression in assessments and nonverbal manifestations. By means of experience and assessing of the relevant information significance, person transfers other people his own understanding of its importance and values. The opposite process of transferred senses and values' comprehension is carried out in a similar way: other participants perceive the senses transferred in emotional and verbal assessing. Thus, the empathy is a comprehension form of other's senses.

Relatively recent research on the analysis of the criteria of the introduction of information into the image of the human world in individual thinking [5] as well as in the conditions of collaborative thinking activity [11] has demonstrated that an individual incorporates only individually relevant information that is corresponding to his actual senses, goals and needs. New information is processed by human thinking in order to define its grading (meanings, values and significance) [11].

According to O.M.Krasnoryadtseva, a person incorporates new information during the process of activity. This information is correlated with the formed extrasensory psychological qualities (meaning, sense, value), and the systematization and determination of valence is carried out by the thinking of each person. It helps to create the world image and its active, tense part - the psychological situation [17].

We believe that an additional factor, in the conditions of the collaborative thinking activity, that determines the structuring of knowledge and the world image, is the factor that the teacher and other participants of the learning process are involved in the collaborative activity. And this activity requires each participant's training on how to integrate in personal regulation of sense thinking, values and meanings formed by partners and their teacher, that assumes the existence of a certain participants' readiness to self-change. It means that students should be ready to change their psychological situation, to accept the senses and values of partners, to comprehend them and to transform the world image and the psychological situation. Thus, knowledge transferred by the teacher is not just "lay" or "overlap" on the knowledge learners already have, but there is a process of knowledge active formation, selective choice and construction. In this case, there are two streams, which should correspond to each other. The first stream is coming from the trainee, implying cross-activity, consisting in the selection of information, corresponding to his or her senses, values and information. The second stream comes from the teacher and other participants in the learning process - it is the most essential stream for human formation and education.

In other words, teacher himself must undergo the interest and importance of the information content. It is essential for the informational content transfer, initiation of senses and rise of the learners' interests. Through the transfer of teacher's experience and senses it's possible to implement the function of sense transfer. When teacher's knowledge and culture have acquired such categories as sense, value and meaning, it seems to us that in such a way it is possible to get in the clear field of consciousness of a learner. And thus learner's world of culture expands, changes him like a person and educates him. This, in our opinion, is the subjective or innovative paradigm in education, which uses real psychological mechanisms that involve other people and takes into account the selectivity of perception and systematization of information by a person.

II. RESEARCH METHODS

In order to monitor the organizational peculiarities of collaborative thinking activity, we performed a comparative analysis of the data, obtained in the research of teachers' pedagogical activities at schools of Rostov-on-Don. The research involved 108 teachers, who work at different schools of Rostov-on-Don.

In this regard, we have developed a scheme of standardized monitoring of teacher's activities in the classroom. The question is how teachers' activity is based in connection of collaborative thinking activity organization between teacher and learners or just between learners themselves. The key criteria for the analysis were functions that structure the collaborative thinking activity. These functions are the main components of the developed scheme. In accordance with these ideas, the scheme is divided into four blocks.

The first block is initiative and includes the following components: goal formational; operational; reflexive; prognostic. This block is aimed to take into account the modeling and using of teachers and learners various ways of thinking. The second block is the organization of interaction and sense transfer, which includes the following components: motivational, sense transferring and emotional contact, and organizational components. There is an analysis of the organization and integration of participants on the subject (the content of thinking actions associated with the production of assumptions, hypotheses, etc.) and personal, subjective levels (organization of interpersonal relations) of problem solving in this block. In this case, the analysis of the organization and integration of participants is supposed. It should be carried out on the objective level (the content of thinking actions connected with the production of assumptions, hypotheses, etc.) and personal, subjective levels (organization of interpersonal relations) of problem solving. First of all, it means the creation of a positive emotional atmosphere, i.e. the certain interpersonal relations, in the background of which it is possible to organize and implement collaborative thinking activity. The third block is connected with assessing and consists of the following components: negative assessments; positive assessments. This block is aimed at taking into account the possible types of assessments aimed at various aspects of the students' personalities and their activities (actions, operations, ways and means of achieving the objectives). Different forms of assessments, mostly verbal, were recorded in the scheme. The fourth block is practical; it includes specific actions for the implementation of decisions; it takes into account the peculiarities of use and development of proposals and plans in practical activities during the course of education. The significance of the obtained differences was calculated by using non-parametric Chi-square, the SPSS.20 computer program for Windows.

III. DISCUSSION OF RESULTS

The received results are based on the standardized observation of school teachers in Rostov-on-Don and Rostov region. They are presented in Table 1. The table shows (in %) the average values of the usage of different frequency components of the collaborative thinking activity functions (Table 1). The use of the chi-square criteria made it possible to detect significant differences in the blocks of the questionnaire; the results are presented in Table 2.

If we compare the data, presented in the Table 1 by blocks, the highest average results are in the block "Organization of interaction and sense transfer", and then go, in descending order, "Practical", "Assessing" and "Initiative". The ranking of the obtained average values in descending

order shows that first five ranks fall into the next components: motivational, emotional contact and sense transferring, practical, positive assessment and organizational. The last ranks in terms of frequency fixation are assigned to the components belonging to the "Initiative" block.

TABLE 1. THE USAGE OF FREQUENCY COMPONENTS OF THE COLLABORATIVE THINKING ACTIVITY

	Name of the questionnaire blocks									
	Initiative		Organization of interaction and sense transfer			Assessing		Practical		
	Goal formation	Operational	Reflexive	Creative	Motivational	Sense transferring and emotional contact	Organizational	Negative assessments	Positive assessments	Practical
Frequency of use (%)	56,14	62,30	46,58	31,52	68,44	66,67	62,92	38,45	63,49	64,08
Ranks	4	5	3	1	10	9	6	2	7	8

TABLE 2. THE SIGNIFICANCE OF DIFFERENCES OF THE COLLABORATIVE THINKING ACTIVITY COMPONENTS

№ n/n	Name of the questionnaire blocks	Organization of interaction	Assessing	Practical
1.	Initiative	,324	,307	,001*
2.	Organization of interaction		,009*	,001*
3.	Assessing			,0141*

* - differences are significant at X^2 0,01

In the connection with teachers` thinking realization possibilities, we were first of all interested in the data, which characterizes the peculiarities of the "Initiative" block representation. It should be noted, at once, that they are considered the least mentioned peculiarities, among all others, in the activity of a teacher. If we consider this block by components, one of the most represented component is the operational one. It gives the best opportunity to implement the technical aspect of thinking which is associated with the use of various actions, such as: comparison of different opinions, generalizations, definitions of the falsehood or truthfulness of judgments, etc. The second place in this block in terms of frequency usage is occupied by the goal formation component. It means that setting goals and their transformation, in accordance with the conditions appearance of pedagogical activity, determining the ways of their achievement, hypothesizing and assumptions, the sufficiently represented in the activity of the teacher. The reflexive component, which is specially marked, to denote the reflexive ability to prove or explain something to others, to give an example or rule, to reproduce the algorithm, is already less developed. The average frequency of its usage by teachers (46.58%) indicates that less than 50%

of teachers try to develop this important thinking ability of learners. The less represented component is the one that characterizes the creative beginning of thinking (31.52%). This component is associated with the production of unknown knowledge, actions, behavior prediction, formulation of paradox questions, creation of situations of "scientific ignorance" and mental experiments.

Thus, the presented data is an evidence of how often the possibilities of implementing various peculiarities of thinking in traditional education activity are used (almost all of the interviewed teachers said, that they work within the framework of the traditional education).

At the same time, the results seem to be quite positive. From the point of view of the organization of interaction and management of this process, the modern school lesson is at a relatively high level. The highest frequency of use falls on the motivational component (68.44%), i.e. almost 70% of teachers use different means of motivation during their lessons, encouraging students to interact; for this purpose organization, control, indirect and direct control over activities, relationships through requirements are carried out, through the providing of assistance or help, it is - 62.92%.

Significant achievements are observed in the organization of emotional contact and sense of communication - 66.67%. This indicator is achieved by creating a common emotional atmosphere, creating emotional contacts with students, accepting their emotional states and transmitting their personal feelings and also the significance of the material.

It is interesting to note the unexpectedly high results of the positive assessments` frequency, despite the widespread thoughts of the negative assessments` dominance at school. According to the results of the observations, they clearly predominate in comparison with negative ones (almost 1.5 times), and, moreover, they are among the first five most frequently used components (the fourth rank). High performance of the components of sense transfer and positive assessments are not accidental. As we have already mentioned, these components are interrelated: the transfer of senses is carried out by emotional means. At the same time, high rates of sense transfer show that by means of engage in communication and joint activity, as one of the mediating mechanisms, sense transfer can lead to different effectiveness of learning. With regard to educational process, it is almost impossible effectively learn outside the sense transferring, but it is also difficult to imagine high learning results without the necessary informational content. It seems that the obtained results show generally quite favorable picture of a positive atmosphere in the relationship between teachers and learners. However, in the context of traditional teaching, the sense transfer is "charged" to translation and comprehension of knowledge in terms of the explanatory-illustrative method and also mainly serves as the processes occurring in the reproductive level.

Sufficiently high results (64.08%) fall to the part of the practical component, associated with the development and acceptance of hypotheses, assumptions, and the creation of conditions for intensive work. These data just show that the forming part of thinking activity associate with the development of practical thinking and it is quite representative.

Thus, the analysis of the obtained standard observation`s results over the possibilities of usage various components of thinking activity, allows us to make the conclusion. The characteristics of thinking, fixing its initiative sides, actually launching and developing the subject basis of thinking, in the denoted components, compared to the rest, which are represented by the lowest meanings. It emphasizes the importance and representation of thinking in the field of traditional teaching. Low values of these components characterize both the attitude of teachers to this reality and the possibilities of its use in traditional school.

The indirect evidence of this conclusion is the results of dominant forms observation of communication between the teacher and learners in the classroom: 65.40 % is a dialogue with individual pupils; 84.60 % is a dialogue with class; 23.10 % is a dialogue in dyads (microgroups).

Thus, school is still continue to be under the domination of communication forms that are based on the interaction of the teacher with individual students or entire class, while group forms of education that are more appropriate to the social nature of knowledge and that encourage thinking initiatives are represented in the activities of a few individual teachers.

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