Game Frame of Reference as a Precondition for Students' and Teachers' Self-Realization

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Abstract
Living in a time of change and reorientation in many fundamental aspects of life, an individual faces a problem of self-determination and self-realization as well as feelings of uncertainty. Heightened development and complexity of the modern man's personality requires special effective methodology for its successful implementation in the educational process. There is a growing demand for new interactive technologies in the educational process throughout the world. This paper discusses theoretical aspects and the practical experience of teaching in contribution to teachers' and students' self-realization, and it presents the use of cognitive didactic games as a means for joint creative activity and interpersonal communication that can contribute toward that self-realization.

Key Words
Self-realization, teaching mathematics, interpersonal communication, joint creative activity, didactic game, analytic geometry

Introduction

Our rapidly changing social life structure and unpredictable life conditions challenge every individual's self-determination and self-realization. Despite increases in scientific and technical innovations, the number of special research works devoted to high school students' and teachers' self-realization is relatively small.

Taking into consideration the uniqueness of each teacher and student, it is necessary to create a pedagogical environment that would provide for their positive, versatile, and adequate self-realization and would be a foundation for their subsequent prospects of development. However, not enough attention is given to the creation of corresponding organizational-pedagogical conditions in educational institutions. Hence, there is a relatively wide discrepancy between existing possibilities and the demand for students' and teachers' self-realization in the educational process.

The main purpose of this paper is to offer my personal opinion and experience concerning teaching of mathematics with a view to creating conditions for teachers' and student's self-realization. My assumption is that aspiration to self-realization is one of the chief motives of personal development that induce and direct individual activity. It is thus necessary for teachers to refrain from an authoritative style of thinking and to master a democratic style of pedagogical activity based on cooperation, interaction, and creation of conditions for self-realization. A teacher who focuses only on the cognitive side of educational activity has a few chances to educate, because filling "the room of knowledge" does not promote personal development. Under such conditions students function in an artificial world of disciplines and artificial forms of activity, with very little reference to professional activity. Instead of becoming proficient in a professional area, the student only receives pure knowledge of it.

Traditional study uses artificial forms developed specifically for "knowledge transfer," with lecture dominating among them. Moreover, traditional lectures are often cognitive-passive and develop critical thinking insufficiently. The activity structure by definition contains motive-purpose-means-method-result-correction of the subject of activity, resulting in the educational activity becoming much more effective. In the conditions of traditional study, the mechanism of goal setting

and goal achievement is not formed; goals and tasks are already generated and imposed by the teacher, and students at best accept the offered goals. The same could be said about decision making: Traditional study is not intended to create situations where a student could and should make the decision and learn to bear responsibility for it; most student exercises are clearly formulated, while most real-life problems are not. Thus, the reasons for underestimating potential possibilities of the student and enhancing his or her continuous social and psychological dependence can be found in conformist character of traditional pedagogical activity. Infantilism of many modern young men is a by-product of traditional education.

Unfortunately, there still is a prevailing thought among a great number of teachers that their focus should be knowledge transfer. Methods are mainly developed for this concept: All necessary information is regularly given at the lectures, and then by various means (such as a practical tasks, seminars, etc.) it has to be memorized. The educational process in high school is still very often reduced to direct reference to students' memory, and not enough attention is given to development of their activity and attraction to solving of actual problems. Much emphasis is placed on learning standard solutions to existing problems, but little time is spent in developing creative thinking in students.

Such expert training methods do not provide qualitative education, because quality is determined not by the knowledge checked at examinations but by the ability to find new decisions and independently obtain new knowledge. The aim of pedagogical activity of the modern teacher must shift away from the desire to give students a maximum of knowledge and toward a tendency to develop their creative potential and give a maximum of adaptability. The aim of the academic process is to create conditions for realization of student creative potential as soon as possible. The creative qualities of an individual are formed not by storing up everything given during lectures, but in the process of certain purposeful activity—activity generated by important personal requirements, activity accompanied by emotions that create an effective motive for it.

Hence, the system of student training should approach this pattern—that is, the focus should be personally significant purposeful activity instead of aspiration to simple memorization. Teacher should understand that the academic process should increase inquisitiveness in students; it should evoke interest instead of diminishing their desire to learn. Consequently, the system of specialist training should take into account conditions that cause emotions and use them widely in educational process. Otherwise, the study process will be uninteresting and, accordingly, results will be unsatisfactory.

Self-realization in the Educational Process

Teachers, for the sake of their own self-realization and the self-realization of their students, have to reconsider methods of pedagogical activity and develop a curriculum that combines education with the learner's future activity. Students should feel their growing professional skill from the first year of study, so that each new skill they develop results not just from academic requirements. Such situation will lead to the occurrence of positive emotions that immeasurably increases the students' abilities and plays a huge role in improvement of training quality and self-realization.

I suggest that a cognitive didactic game may help teachers achieve these tasks. Games have special value in human life; people play from childhood until the end of their lives—only the forms of game may differ. Games are unmistakably connected with problem solving that demands self-

dependency, creativity, activity, joint efforts, and direct interactions. The problems of didactic games have emotional coloring and consequently are better perceived.

Interactive technologies can be used i as a stimulating factor in student activity. Teachers who can design lessons that are interesting and captivating may expect learning to be more effective, as this approach deeply involves the learner and is seen as an entertainment instead of something tedious and uninteresting for students.

However, in order to see a positive side of using interactive technologies in the educational process, teachers should aspire to self-realization in professional-pedagogical activity and share the following valuable purposes: (1) joint creative activity, (2) dialogical (interpersonal) communication, and didactic games.

Joint Activity

Joint activity allows its participants to make something important together. There is a situation of general creativity when participants make something new (objectively or subjectively), and each of them themselves as a creative person.

The problem of joint creative activity has three dimensions for the teacher. The first dimension is the organization of joint activity of students with each other. The second dimension is a joint creative activity of teacher and student. The third dimension is a joint creative activity of teachers. And if the first dimension does not directly concern problems of teacher self-realization (the teacher is the organizer but not the participant of joint activity of students), the other two dimensions are much more closely connected with teacher's creative self-realization. In joint activity of the teacher and the student, the student feels himself or herself as a subject of creativity (the student is doing something never done before). Is the teacher a subject of creativity under such circumstances? Yes, if he or she sees the educational aspect of joint activity—the teacher's creativity is in development of the student's personality. Creativity of the student is directed on changing the world around him or her, while creativity of the teacher is directed onto education and development of students. Similarly, in the process of joint creative activity with colleagues, various possibilities of creative self-realization open before the teacher. Therefore, valuable orientation on joint creative activity with students and colleagues is one of the major determinants of the teacher's self-realization in professional work.

Dialogical Communication

Joint activity of people is possible only by means of their communication. Therefore, dialogical communication as another valuable orientation that defines the process of teacher professional self-realization. In pedagogical activity ,communication through dialogue is considered as a condition of realization of subject-to-subject relations between the teacher and the student, unlike traditional subject-to-object (monologic) relations. While subjects are divided into active and passive in a monologic communication system, dialogical communication requires activity of all participants. The essential attributes of *interpersonal communication* include independence of dialogue, equality of interlocutors, and mutual understanding.

With independence of dialogue, partners do not intend to influence each other, creating optimum conditions for real influence on the development of personality, as freedom of self-determination is necessary for personal growth. It is freedom of self-realization, freedom to be yourself that plays the leading part in a dialogue. At the same time, assuming responsibility for oneself and one's freedom makes one more attentive and tolerant to opinion of others. Freedom of dialogue partners is not absolute; it is limited by an range of rights.

Equality of interlocutors as a "mutual recognition of each other's freedom" is the second attribute of interpersonal communication. Solving the most important communicative problem of matching the rights (rights agreement), scientists offer original model of "communicative rights of the person" together with "communicative responsibility of the person."

The third attribute of communication is a personal contact between interlocutors on the basis of empathy and mutual understanding. Mutual understanding creates a contact rationale, but it is the empathy as emotionally intuitive comprehension by interlocutors of each other's private world that creates unity of a experience matching that is a deep basis of contact, "a dialogue connecting-link." Other features of interpersonal communication—openness and interlocutors' trust, their co-authorship—are deduced from the three abovementioned attributes.

This leads us to the conclusion that dialogical communication creates the most propitious conditions for creative self-realization of the person (especially for personalization). This circumstance, as well a deficiency of such communication in educational practice, gives every teacher a goal to organize a frame of reference for dialogical communication.

Game Frame of Reference

Game frame of reference is the last of the three teacher's orientations on creative self-realization. *Game* can be defined as a form of reconstruction of the subject and social content of the future professional work or modeling of relation systems typical for this activity. Games are played by voluntarily accepted rules and are accompanied by feelings of enthusiasm, tension, and pleasure. For humanistic schools of the past and present, games have been one of cornerstones of their existence. Why is game playing so important for pedagogical activity?

First, games expand the sphere of pedagogical activity, enriching the professional position of the teacher with a so-called game positioning. Game communication is a powerful educational method that allows the teacher to do various maneuvers in both business and personal communication. At the same time, business behavior appears to be not entirely business, and personal not entirely personal. The students choose that sense from the teacher's game behavior that is more acceptable for them, thereby strengthening interaction between a teacher and a student. Everything is a little fib in games; everything is not about me and not about you—it is about a role and therefore I am *free* to accept or not to accept, to respond or not to respond the "educational signals" sent to me. Both the student and the teacher feel more free in a game; they have more space for self-realization.

Second, game creates possibilities for co-authorship and general creative development of the teacher and the student. Co-authorship in games provides:

- The subject-to-subject relations when the right and ability to make decisions is obtained by each participant in the creative process (irrespective of age and experience)
- Active position of all participants in the creative process
- Creation and preservation of the corresponding atmosphere, mood, and emotional background by participants in the creative process
- Preservation of everyone's individual style of creativity

The following set of recommendations can describe the teacher's behavior during the game:

- Provision of an atmosphere of friendly conversation
- Inspiration with internal feelings of interest, excitement, singularity, intrigue, and so on

- Refusal of categorical evaluation and criticism toward students
- Encouragement of original ideas
- Creation of conditions for exercises and practice
- Preservation of students' individual style of self-expression through refusal of direct demonstration, labeling and stereotypes, direct teaching
- Activation of the teacher's own self-expression

Hence, the possibilities of creative self-realization together with the student are opened for a teacher in games as perhaps in no other activity.

Learning should be based not on transmission of ready-made knowledge but on creation of conditions for creative activity, and business games are not only an effective way of knowledge mastering and skills formation but also a method of professional communication. With games, contradictions between the abstract nature of an academic subject and real professional activity are eliminated, and the competitive nature of business game stirs up the imagination, helping students to find the correct solution of the problem. In games it is easier to overcome stereotypes, generate certain principles of professional work, and correct a self-appraisal. While traditional methods are directed more to the intellectual sphere, the whole personality of the student is involved in games.

An Example: Games in Analytic Geometry

I developed the business game "Curves Help a Person" for a course in analytic geometry. Its purposes are:

- To generalize and check students' knowledge and abilities in second-order curves; to learn to apply the received knowledge to solving practical problems using modeling of real practical situations
- To establish intersubject connections
- To improve students' outlook
- To present a concept of mathematics as a part of universal culture, emphasizing the importance of mathematical knowledge in history of civilization and modern society
- To develop joint activity skills, communicative skills, and responsibility for collective decision
- To stimulate an interest in analytic geometry

In this game, the student audience is divided into four groups (departments). Characters include employees, department heads, and the chief. The floor is taken by the chief, who emphasizes the fact that geometry is around us everywhere: radio masts consist of separate sections of one-sheet hyperboloid, high-voltage lines form catenaries, easement curves on railway tracks, etc. Geometrical lines and surfaces are used by people because of their properties that allow us to solve various technical projects most effectively.

Game participants are working at these enterprises as architects, designers, builders, biologists. and even astronomers. As an example, the astronomy department might receive an order like this: "The planets of the Solar System move around the Sun on ellipses; find the eccentricity of Venus's orbit if it is known that the shortest distance from Venus to the sun is 107.5 million km, and

the greatest is 109 million km." As another example, the chief might suggest that departments work as architects and to construct a bridge of a certain shape.

In another task, students are designers who must try to solve the problem of what distance from a bottom of a projector's mirror a bulb should be arranged to make it reflect beams as a parallel bunch and form a 30 sq. mi circle on a wall. Finally, students are working as biologists are asked to solve a problem such as this: Calculate the length of the first coil of a snail shell if it is twirled in the spiral of Archimedes and the distance between coils equals 12 mm. In all these tasks, the work of departments is estimated at 100 points; a penalty of 25 points is imposed for each mistake, and the first team done receives a 50-point award.

It is necessary to design such games with the possibility for each player to make a decisions; the greater the freedom of choice, the more willingly players join a game.

At the end of a game, participants should discuss mistakes they made, find out why this or that decision was made, and what results it has brought. It is also possible to lead a discussion and to offer the following questions: Was the game interesting to play? What was its main problem? Why were such rules chosen? Did it meet conditions of reality? What would you change if you played the game again? What were the advantages of the game?

Conclusion

Beyond any shadow of doubt, the need to modernize higher education has manifested itself. The valuable goals discussed in this article may be a response to the growing demand for new approaches in education. Engaging the students in joint activity, communication, and games provides more opportunity for them to be actively involved in the learning process. From my experience, students' egocentric tendencies in thought and social behavior decrease, their social sensitivity is sharpened, their orientation on perception of new information is formed, their threshold of perception of the standpoint of others decreases, their creative potential is actualized, and their adequacy of self-appraisal increases as a result of team play.

The educational function of business games is very significant because they provide a positive environment in which students are active participants rather than passive recipients of teaching, creating conditions for the development of the expert. Business games model real industrial or scientific activity and are an effective form of collective knowledge.

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