Encouraging teamwork amongst students

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Abstract

Learning to work as a team means learning more about each other, collaborating better and achieving higher performance, achieving goals and objectives. Schools provide ideal opportunities for teamwork. This article studies how teamwork can be fostered. Using methods of increasing cooperation helps students develop the conceptual understanding of a subject, form the ability to filter information and draw conclusions, taking into account other points of view. The stimulation of cooperation by using specific methods and tools contributes to achieving high performance in students, as shown in the study that we conducted during the 2014-2015 academic year, with the students of the Faculty of Mathematics and Natural Sciences – Department of Physics and Department of Chemistry. Starting from the significance of linking students through cooperation within the team, we have implemented a Technological model of stimulating students' activity in order to optimize the teaching interaction and, especially, to foster progress at a cognitive and intellectual level.

Key words*: cooperation, interaction methods, teamwork, stimulation*

Introduction

The society today is an informational one. Professionals in any field of knowledge or any sphere of activity must collect and interpret a wide variety of information. Because the world of jobs is a technology and collaboration-based profession it is necessary to reach consensus as the basis of the studies and research undertaken. In education, specialists also relate themselves to specific national standards and curriculum

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frameworks (sometimes rigid, sometimes more flexible and airy; in some countries, they are more traditional and in others more innovative according to the way society, science and community mentality develops). It can be observed that "historically, teachers were trained more for individual practice than for group practice. Secondly, because of the poor funding and despite the increasing demand, schools and teachers have spent too little time to collective work. Thirdly, the collaboration (students, parents, community members) requires much time and many meetings, commitment, continuity, mutual understanding, etc." (apud Ferguson, 2006, pp. 4-5).

Approached as interaction, effect of the interaction, coordinated and synchronous activity, situation, mechanism, method, instrument, social contract, principle, integrative conception, collaborative learning is, for us, a *social construct*, an effect of interaction which emphasizes the meaning each participant gives his personal experience, from the perspective of achieving the joint aims (goals and objectives).

We understand cooperation as an applied form of collaboration, addressing small groups, teams, pairs of students. Genuine cooperation influences the way the group or team develops and helps to achieve high performance on a cognitive, intellectual and socio-emotional or behavioral level. Weobserve that "very different authors such as sociologists Durkheim and Mauss (1903), psychologists Mead (1963), Piaget (1932) and Vygotski (1962), ethnologist Humphrey (1976) have developed, each in a different scientific context, the postulate of the intervention of social interaction in the cognitive development perceived at its individual or historical dimension" (Doise, 1996, p. 136).

According to socio-constructivism, collaboration is a process that favors, individually, the progressive construction of knowledge by appealing to meta-cognitive abilities. At an interactional level, the focus is on the social skills training as joint activity. Working in teams, students confront their own ideas with the others', negotiate meanings, develop their cognitive processes as well as the emotional and readjusting ones.

The specifics of teamwork

In common language, the term "team" is also used to name a small group. It can be said that the team is a group. However, not every group is a team. This is confirmed by the definition of JF Leroy, where the team is "an entity known by an organization, formed by a permanent or long-term group, composed of interdependent individuals pursuing one or more common objectives in a compelling context" (Leroy, 2001, p. 428). The word "group" has a broader meaning and not always refers to the people, while the term team is more specific. Otherwise, "all teams are hypergroups because they possess the basic qualities of any group, but to a more intense degree" (Forsyth, 2010, p. 353). Teamwork is addressed, most often in terms of cooperation, being defined as "a cooperative process that allows ordinary people to achieve extraordinary results" (Scarnati, 2001, p. 5) or as "a group of individuals who cooperate to enact a certain routine" (Goffman, 2003, pp. 102-103). As J. D. Katzenbach and Smith stated, the team is "a small number of people with complementary skills who are committed to a common purpose, performance goals and methods which they are mutually responsible for" (apud Armstrong, 2004, p . 249).

Specialized literature contains important studies on the subject. Teams have the following features (Muller, Pitsoe and Niekerk, 2013, p. 1):

- They are best suited *to solve complex problems* that require different views and knowledge;
  They represent *an excellent learning environment*;
- They are much more *goal-oriented* than the organization as a whole and they much more easily establish their vision and a specific goal (it is easier to identify a goal of a team);
- *They better exploit the resources of each member*;
- *They are more flexible* than the groups because they can be more easily formed, dissolved, reorganized or resized;

- *They cultivate loyalty* and work on the principle "all for one and one for all";
- *They encourage the delegation* of responsibilities because they provide the guarantee to control its members' behaviour, by their own rules.

P. Tarricone identifies the following key attributes of teamwork, several descriptors corresponding to each of them (apud Tarricone and Luke, 2002, pp. 2-4):

1. *Commitment to team success and shared objectives*: participants understand that they have a common mission, values and strong beliefs, one purpose and are more aimed at objectives that each team member provide prestige and recognition for; there is motivation and commitment to succeed, it creates a casual, relaxed, comfortable space and there is cohesion, too;

2. *Interdependence*: there can be no success if the other members of the group fail, and together they can deliver more information or experience than the individuals in isolation can produce; team members interact to help each other in achieving the task and people experience a wide range of new ideas and skills when interacting with others;

3. *Interpersonal skills*: people care for one another, they protect and support one another, they are respectful and realistic, they have common expectations; feelings are expressed freely, with a high level of confidence and commitment;

4. *Open communication and positive feedback*: the feedback is sent and received in a non-defensive way, listening is valuable and serves the needs of the group; there is committement and open dialogue, a spontaneous positive feedback that allows expressing the group feelings as well as listening to all the ideas and feelings;

5. *Adequate composition:* successful teams are a product of the composition of each member; roles are clear, relationships are based on

responsibilities and there is talk on the differences each member must do in order to contribute to joint work;

6. *Commitment to leadership and responsability*: it relies on timing efforts and acceptance of individual responsibility, team members are responsible for their part of the work; what matters is encouraging decisions by consensus and experimenting new ways of working by looking for the best practices (the following aspects are also important: opennes to change, innovation and a creative approach to common issues together with monitoring the progress of the team).

As reported to specific criteria the defining characteristics of a team are (Ilie, 2009, pp. 21-22):

Table 1. Characteristics of the team

Criteria	*Characteristics of the team*
Goals pursued	- Reaching them is an assumed fact - Efforts are being made to achieve them
Reasoning of grouping	- In order to solve certain tasks or issues (it relies on the organization or the community as an entity)
Assuming responsability	- Members are interested in both their own development and the collective development - Responsibility is divided among all team members
Relationships (of communication, socio-emotional, of leadership)	- Members talk openly, without hypocrisy and make efforts to understand and help others - All of them feel supported by their colleagues and are encouraged to develop their skills - Each of them participate in making decisions, their leader only controls the situation when the team cannot decide or when an emergency occurs
The roles played	- There are no preset roles - Roles are preferred to change depending on the circumstances
Approaching conflicts	- They are seen as normal aspects of professional relationships, opportunities to deliver new ideas, to encourage free

	expression - In case of failure, moral and administrative, penalties belong to the team
Perception of success	- Rewards are both collective and individual in relation to the extent of performance

The teams condition the optimization of each member's abilities by making it possible to solve different problems. During the educational process the educational objectives can be achieved by harnessing the team, this way the students obtaining better performance.

Following research into the subject, we have identified a series of *misperceptions* that relates to teamwork (apud Hackman, 2011):

1. *Harmony helps*: interaction between collaborators helps in saving time and favours debate on the most effective ways to continue. *In fact*, research shows otherwise: conflict, if it is well managed and focused on team goals, can generate more creative solutions whereas disagreements can be constructive for the team.

2. *It's good to include new members*: new members bring fresh energy and ideas to a team. *In fact*, members better solve tasks together as a group if they stay together, intact. Whether it is a basketball team or a string quartet, teams that play together stay together better.

3. *Bigger is better*: larger groups have more resources to apply at work. *In fact*, the excessive size is one of the most common and also one of the most serious impediments to effective collaboration. The higher the group is, the bigger the probability of social inactivity and effort to coordinate activities of the members. Small teams are more effective.

4. *Face-to-face interaction belongs to the past*: now,that we have powerful electronic technologies of communication and coordination, teams can perform their tasks more efficiently from a distance. *In fact*, team members who work from a distance are in disadvantage. A number of organizations that rely heavily

on distributed teams found that they spend time and money to bring their members together in order to complete task.

5. *It all depends on the leader:* the differences between the two teams, where one works well and another badly depend on the personality, behavior or style of the leaders. *In fact*, the activities of the group leaders make a difference. The most powerful thing a leader can do to promote an effective collaboration is to create conditions to help others to competently manage themselves. The second thing is to launch good team, and the third, to teach and train when the work is in progress.

6. *Teamwork is magic*: in order to have many benefits, it is important to gather together some very talented people and to know in general terms what needs to be done. *In fact*, it takes careful consideration and serious training for success. The best leaders provide clear, detailed information and ensures that this team has all the resources and support needed to succeed.

There is also a number of perverse effects and problems encountered in teamwork: group thinking, social laziness, the "Apollo" syndrome, the seductive nature of hierarchy, routine decisions or made under time pressure, conservatism and inclination to compromise, differences in knowledge, variability of personal resources, poor management style, the "clone team" myth. The teacher should know these issues because when students work in teams they behave differently than if they work individually (with or without support) and frontally. Working in the presence of others promotes performance and change the "individual assembly" self-concept.

Playing different roles within the team, students try their own forces and test their qualities. The INTERPLACE expert system (widely used in England and in other countries) is designed to highlight individuals who cooperate successfully with others. M. Belbin defines the term "team role" as "a pattern of behavior characteristic of how a team member interacts with another member, its performance serving to facilitate the team's progress as a whole" (Belbin, 1981, p. 169)

In relation to the tasks required by solving the tasks, with the specific personality traits of each team member, but also with the "scores" played by the participants within the team, we notice the following *roles:*

1. According to their focus on the people (a), action (b) and thinking (c) (Belbin, 1981):

a) *Co-ordinator, Team Worker and Resource Investigator*

- *Co-ordinator / Chairman*: it is concerned about fairness and equity, it clears objectives, allocates roles and responsibilities, articulates its conclusions;
- *Team Worker*: ensures the long-term cohesion, provides personal support and helps others, it is socially oriented, sensitive to the needs of others, and it settles conflicts;
- *Resource Investigator*: it has relationships, access to human and financial resources, exploits opportunities, contacts, negotiates with foreigners, and responds to challenges;

b) *Shaper, Company Worker / Implementer and Completer Finisher*

- *Shaper*: has the courage needed to overcome obstacles, seeks working mode, pushes the team forward and provokes others;
- *Company Worker / Implementer*: he / she is the practical thinker who can create systems and processes that will produce what the team wants, rooted in the real world;
- *Completer Finisher*: he / she deals with the details, notes flaws and shortcomings, he/ she is analytical and meticulous;

c) *Plant,Monitor / Evaluator and Specialist*

- *Plant*: he / she is imaginative, creative; he / she solves difficult problems;
- *Monitor / Evaluator*: sober, discerning, evaluating the contribution of others, objective analyzer, monitors progress and prevents mistakes, identifying all options;

- *Specialist:* he / she provides team expertise, he / she is dedicated, offers expertise and has rare and unique skills.

2. According to the emphasis on motivation, stimulation and participation (Harrington, 2000):

- *The promoter*: he / she promotes team work and determines how decisions are made, mediates and helps in solving conflicts, suggests techniques for solving problems;
- *The leader*: he / she leads the team to get the best results and determines what decisions need to be taken, provides direction, manages time, records the results and supports the assessment team;
- *The participant*: he / she shares knowledge and experience, actively participates in team meetings, supports the implementation of the recommendations.

3. According to the specific actions in building a coalition (Owen, 2008):

- *The player*: aims to building the coalition which is able to help him / her in supporting the program that he / she wants to implement;
- *The godfather*: being part of the executive management he / she is the one who pulls the strings and holds supreme power;
- *The consumers*: they are the ones who will express more clearly the need for the project;
- *The guards*: they are the people who supervise the door to power,
- *The soldiers*: they are the resources that have the skills needed for the project;
- *The technocrats*: they are in the financial sector, checking the numbers, but we can also find them in the legal department, human resources, health or safety;

- *The coaches*: they are like gold dust – they have experience, many skills and goodwill, they know how to deal with different people and how to best promote the agenda.

Most pedagogical research on the interaction specific to the students group or team focuses on the roles of the teacher and less on the students'. In both cases, however, what interests is the behavior of the participants in their interaction, in conducting the educational process that gains value when the actions based on cooperation are valued.

Ways of stimulating teamwork

Collaboration reflects a specific relating way, which is actually a condition of learning in the (school) community, in the classrooms, in the group or team of students. Cooperation, however, is a form of learning that uses different methods and techniques able to stimulate and exploit interaction. If in some approaches, cooperative learning refers to a set of instructional strategies, to a variety of teaching methods, in others, cooperative learning is seen itself as a teaching method. If in the case of collaborative learning the emphasis is on the process of learning, in cooperative learning, the process and the product are equally important. The first provides organizational conditions, recquires joining together in solving problems (the sub-themes). Starting from the question "is collaborative learning a teaching method or a psychological process? ", P. Dillenbourg believes that "teaching has a prescriptive meaning: someone who asks the others to work because it is expected that this way they will learn effectively. The psychological meaning is a descriptive one: it is observed that two or more people who have learned together understand cooperation as a mechanism that causes and produces learning" (Dillenbourg, 1999, p. 4).

Essential for the teamwork, cooperation means "gain in terms of interaction between students, communication, mutual attitudes and group cohesion. (...) Cooperation gives rise to a more relaxed climate, where each can

work according to their own capacity" (Sălăvăstru, 2004, pp.134-135). Moreover, inter-personal cooperation has a role in developing intellectual activity. Thus, according to J. Piaget, cooperation is the source of three kinds of transformations of the individual way of thinking: "source of reflection and self-awareness, the source of objectivity, that transforms immediate experience into scientific experience and source control" (apud Doise, 1996 pp . 308-309).

Beyond the limits that cooperative structures may have in a group (loss of individual motivation, reducing effort by associating with others in solving collective tasks), we consider cooperation to be more effective than competition, especially on the social, community, organizational level. And, as the school prepares for life, we need future adults who should have practiced prosocial behavior, altruism, teamwork since they were in school. Therefore, we recommend that teachers encourage interactions in the classroom or workshop / laboratory, knowing that "the teacher is a human agent whose main function is to initiate the acceleration of the rate of concept change and accomplish this trait" (Mintzes, Wandersee and Novak, 2005, p. 337).

The studies on the subject (Doise and Mugny, 1981; Nemeth and Watchler, 1983; Brown and Abrams, 1986; Brown and Wade, 1987) highlight the advantages of group and / or team work and the effectiveness of cooperative learning methods. Both viability of individual understanding previously completed and outlining some common issues are to be seen in cooperation, which is an opportunity to find out how many building alternative can be formulated, what interpretation can be made and from what perspective (Glasersfeld 1989, pp. 6 -7). The constructivist perspective can take two forms: the cognitive perspective (it does not deny the possibility of learning in groups) and the social approach (it does not negate the value of working independently of the others). It is stated that "cooperative learning is a phrase used to describe the strategies of small groups where each student is helped by others in learning. In fact, the success of each member is the success of the other members of the group" (Henson, 2004, p. 20). Representing the highest level of collaboration,

cooperation is “a socially oriented activity in which individuals cooperate with others to achieve a common goal” (Ausubel and Robinson, 1981, p. 491).

M. Deutsch is the one that has defined and classified cooperative learning in a theory. He conceptualized three types of social interdependence (positive, negative and non-existent). The first encourages interaction among people working together and it is called “cooperation-based interaction and stimulation”; the second is characterized by mutual obstructing of the members of a group to achieve a goal, being called “opposition and competition based interaction”; interaction is nonexistent when the members of a group work independently (Deutsch, 2000, pp. 21-40).

As an application of the model of building understanding / collaborative learning at the basic level, the efficiency of the learning model in pairs has been verified, too, the pair being a minimal group, the first collaborative framework. The strategy based on this model provides an opportunity for all students to share their way of thinking with at least one other student. Working in pairs is very efficient and there are recent studies that support this idea (Manouchehri, 2002; Bullough et al, 2003).

The approaches that encourage mutual learning are effective, especially when personal development programs foster teamwork and when school is based on “critical friends” – Fullan, 1993; Joyce, Calhoun and Hopkins, 1999; Brighouse and Woods, 1999 (apud Sorensen, 2004). Therefore, we believe it is useful to incorporate the practice of cooperation in teacher training.

Most models and learning strategies encourage active learning opportunities, providing real-life examples, integrating new information technologies and multimedia. In recent years there has been more emphasis on the use of information technology in teaching “Educational software packages, World Wide Web, web pages, e-mails and, of course, group discussions, notice boards and audio applications, video or multimedia on the computer have changed the way of teaching in all disciplines and at all levels” (Moazeni, 2012, p. 9).

Computer-Supported Collaborative Learning is a branch that emerged into the learning sciences, being concerned with studying how people can learn together with the help of computers. In the mid-1990s, CSCL approaches began to explore how computers could bring students together in collaboratively learning in small groups and in learning communities. J. Roschelle proposes the term *collaborative technology* which is aimed at building common ways to perceive, react and get to know. He states that technology can be a means by which the society builds common practices. Roschelle's early study designed a software application especially to support building meaning in physics, he defined the students' activities in order to engage them in joint problem solving, and analyzed their collaborative practices in microdetail (Roschelle, 1995, pp. 209-248). It is useful using the computer in developing conceptual maps through the interactive communication system,integrated into *the WWW (World-Wide-Web),* as a *Web-Map* with various themantic and graphic applications. Being thus built this cognitive / conceptual map is also called "Click map".

In the model proposed by R. Slavin cooperative learning methods are grouped in *group study methods* (the students work together to help each other to form a body of relatively good information or skills) and *active learning methods* (it includes a set of methods which refers to the involvement of students in joint projects). The main purpose of this study technique is not to form a team, but to learn as a team (Slavin, 1994, p. 3).

Cooperative learning strategies are widely used. Studies (eg. Johnson, Johnson and Stanne, 2000) highlight a number of cooperative learning methods (apud Johnson, Johnson and Stanne, 2000; Dodson, 2001):

- Johnson & Johnson: *Learning Together & Alone*;
- DeVries & Edwards: *Teams-Games-Tournaments (TGT)*;
- Sharan & Sharan: *Group Investigation*;
- Johnson & Johnson: *Constructive Controversy*;
- Aronson & Associates: *Jigsaw Procedure*:

- Slavin & Associates: *Student Teams Achievement Divisions (STAD)*;
- Cohen: *Complex Instruction*;
- Slavin & Associates: *Team Accelerated Instruction (TAI)*;
- Kagan: *Cooperative Learning Structures*;
- Stevens, Slavin, & Associates: *Cooperative Integrated Reading & Composition (CIRC)*.

By cooperation metacognition is practiced, critical and creative thinking are reinforced, social experiences widen, better results on a cognitive and affective-attitudinal level are obtained. There are a number of methods and techniques for stimulating teamwork which need to be better highlighted in practice and which lead to better results in the academic work of the students. If they are approached from a constructivist perspective, the methods facilitate the achievement of the proposed objectives and support students in their quest for effective learning, as the results of a research on "Cognitivism and constructivism – new paradigms in education. Consequences of initial teacher education as future actors in the European educational space" (DTT, University of Craiova: 2005-2007). These include: *The Tree diagram*, *The generative arrows*, *The dialogue between the optimistic and the pessimistic*, *The Venn Diagram of concepts*, *The comparison matrix*, *The waterfall of questions model*, *The teaching crossword*, *The knowledge coil*.

In the Romanian pedagogical literature, there is a good systematization of these methods and techniques by reporting them to the main teaching position (Oprea, 2009):

- *Methods of interactive teaching and learning in the group*: Reciprocal teaching, The jigsaw method, comprehensive reading, Cascade, STAD (Student Teams Achievement Division), TGT (Teams / Games / Tournaments), Share-Pair Circles, The Pyramid method, Dramatized learning;

- *Methods of fixing and systematizing of knowledge and of verification*: Cognitive map / Conceptual map, matrices, cognitive chains, Fishbone maps, causes and effect diagram, Spider map-Webs, Lotus Blossom Technique, RAI Method;
- *Methods for solving problems by stimulating creativity:* Brainstorming, Starbursting, The thinking hats, The carousel, Multi-voting, Round table, Group interview, Case study, Phillips 6/6, Critical incident, 6/3/5 technique, the creative controversy, the fishbowl, the focus group technique; the four corners, the Frisco method, Sinectica, the Buzz-groups, the Delphi method;
- *Research Methods in groups*: the subject or the group research project, the experiment in teams, the group portfolio.

We can appeal to different methods and procedures, insufficiently studied and used in practice, such as: *the procedures of confrontation with oneself* (thinking aloud, interior monologue, checking their own understanding while acquiring knowledge), *testing through paraphrase, personal reflection*, *reflection and discovery of one's learning style*, *active processes* (testing solutions, application in similar situations, problem solving, computer aided learning, graphics processing of information) *interactive procedures* (learning in pairs or teams, training by changing roles), *self-assessment procedures*, *self-encouragement*, *reducing anxiety*, *emphasize its own success*, *the affirmation of confidence* (apud Cerghit, 2002, p. 222).

Elements of pedagogical research

The pedagogical research that we have accomplished is a practical, applicable and ameliorative one and it developed during the first semester of the academic year 2014-2015. The sample we worked with includes 56 students from year II of the Faculty of Mathematics and Natural Sciences (25 – Department of Physics, 31 – Department of Chemistry).

In grouping the students, we had to ensure their equivalence. We reported ourselves on the outcomes obtained by these students in the first year (2013-2014, semester II) in one of the disciplines of the *Psycho-Pedagogical Training Module* (Foundations of Pedagogy. Curriculum Theory and Methodology). The large group of students was later divided into two heterogeneous groups: the experimental group (G1 = 28 students) and the control group (G2 = 28 students).

The purpose of this research is to stimulate students' team work, through a correct understanding and knowledge of cooperation, and the capitalization of the advantages offered by the interaction of people.

The research objectives detail the purpose and relate both to the theoretical and applicative part.

We aimed at:

- O1: identifying the specific of teamwork;
- O2: the specification of the characteristics of effective teams;
- O3: the classification and description of the roles played by the members of a team;
- O4: explaining the significance of human cooperation and outlining its benefits;
- O5: specifying some ways of encouraging group and / or team work, starting from the main characteristics of human relationships;
- O6: implementing *The technological model of stimulating the teamwork of students;*
- O7: using the methods, procedures and tools to increase cooperation in order to achieve high results in learning by students;
- O8: evaluating the results obtained in an experimental plan and emitting (based on these results) conclusions meant to optimize the educational interaction and, especially, to stimulate progress at a cognitive and intellectual level.

The independent variable is expressed by the methods and tools which stimulate cooperation among students in order to obtain high results at a cognitive level. We tried to control the influence of intermediate variables (of a psychological and social nature) so that the results depend largely on the experimental factor only.

Considering the significance of linking students through cooperation within the team, we have implemented *A technological model for stimulating the activity of students* in seminar classes, in order to obtain high results in the cognitive field for the "Theory and Methodology of Training" discipline.

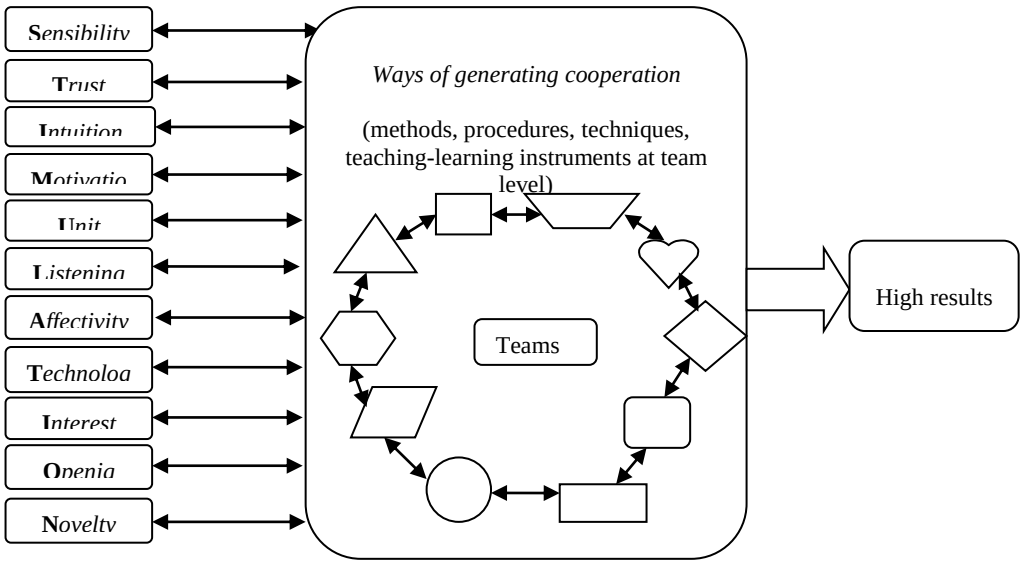

Figure 1. Modelul de stimulare a cooperării studenților prin activitatea în echipă

The research hypothesis: If we stimulate the students to work in teams in ways that exploit the attributes of cooperation, then their performance will increase significantly.

The stimulation of the activity based on cooperation is based on the significance of the following key concepts on which we relied in implementing specific strategies of teamwork:

1. *Sensibility*: refers to receptiveness to something, to the ability to perceive something or someone; it is the ability to feel and understand emotions;

2. *Trust*: an integral part of the idea of social influence is based on the interest in others and implies honesty, competence and similarity of values; success generated by confidence leads to feelings of security and optimism;

3. *Intuition*: is a fundamental function of the mind due to which, suddenly, content is presented to us in a final form, without our knowing how to get here; it is a way of understanding, of learning consciously, performed not only on grasping separate characteristics of objects and phenomena (classical approach), but also on the relationships between them (current approach);

4. *Motivation*: includes motifs, desires and necessities; it has an adjusting character, of accomplishing certain particular needs of people and leads to reaching goals, involving biological, emotional, cognitive and social forces;

5. *Unit*: it refers to the links that bring people closer to each other and form the basis of solidarity; it is the social cohesion which is based on the idea of working together and implies an agreement between individuals gathered around a common goal;

6. *Listening*: active, sometimes objective, sometimes compassionate, refers to the ability to concentrate attention for a correct interception of understanding of those issued by others; it is based on observing behavior and decoding messages transmitted verbally and nonverbally;

7. *Affectivity*: approached as the ability to experience affects, it helps individuals to process emotional information (to solve problems, perform tasks, predict results, etc.); it refers to expressing emotions or feelings;

8. *Technology*: refers to knowing and using methods, techniques and procedures involved in the production of goods, ideas, services and it involves tools, materials and systems; the technological instruments facilitate the flow of information;

9. *Interest*: is a state of curiosity or concern, attention on something, the quality of being concerned about something; causing involvement, participation in a cause, which is based on living enthusiasm and curiosity, it involves stimulating the curiosity;

10. *Opening*: is the opportunity to exercise freedom; it is based on flexibility, it involves adaptability and sends to risk taking;

11. *Novelty*: *r*equires a unique or unusual experience or event and involves dynamics of change; it refers to a different approach, to an original approach, or to getting a product that is different from what was known before.

Results obtained after encouraging teamwork

For the obtained results to be more relevant, we chose to make heterogeneous teams (consisting of 4 students), as we encouraged the students to play different roles within the team they were part of, during solving the specific teaching tasks.

Following the equivalence of the assessment tests, we have formulated similar tasks, but consistent with the theme and contents corresponding to the subjects studied. The subjects given to be solved at the final evaluations focused on the cognitive domain, and the emphasis was on *understanding the key concepts and the relations between them* based on the phrasing of questions (subject I – Item 1), *problem solving*, educational *situations* (subject II – Item 2) and the *interpretation of texts, ideas* with a pedagogical content (topic III – Item 3).

In the final evaluations, the students achieved, for the three items, the following qualifiers:

Table 2. Centralizing the results of the students in the control group (G_2)

Items	*Evaluation scale /Interval of placing grades*			
	Insuficient (1-4)	*Suficient* (5-6)	*Good* (7-8)	*Very good* (9-10)
Item 1	-	7 (25%)	13	8 (28.57%)

Understanding key-concepts and the relations among them			(46.43%)	
Item 2 *Solving problems, situations*	1 (3.57%)	4 (14.29 %)	14 (50%)	9 (32.14)
Item 3 *Texts interpretation, ideas* with a pedagogical content	2 (7.14%)	10 (35.71 %)	11 (39.29%)	5 (17.86%)

Tabel 3. Centralizing the results of the students in the experimental group (G_1)

Items	*Evaluation scale /Interval of placing grades*			
	Insuficient (1-4)	*Suficient* (5-6)	*Good* (7-8)	*Very good* (9-10)
Item 1 *Understanding key-concepts and the relations among them*	-	-	12 (42.86%)	16 (57.14%)
Item 2 *Solving problems, situations*	-	1 (3.57%)	13 (46.43%)	14 (50%)
Item 3 *Texts interpretation, ideas* with a pedagogical content	-	3 (10.72 %)	16 (57.14%)	9 (32.14%)

After a comparative analysis, we find the following:

- Although all three tasks aimed at the cognitive domain, the fewest of *good and very good* ratings were obtained for both groups of students in Item 3. For the interpretive approach more practice is needed, which expresses the need to balance team activities with the individual ones (they have to be done individually or with the support of another teacher or colleague).

- Compared to the control group students (witness), the students in the experimental group did not get grades below the minimum level allowed. Team activity proved to have positive effects in terms of the capacity to handle divergently, more understandingly and from multiple perspectives the tasks suggested.

- For item 1 the percentage difference in grade *Well* is insignificant (G1 = 42.86% and G2 = 46.43%), but there are great variations in grade *Very Good* (G1 = 57.14% and G2 = 28.57%). This difference can be attributed to the correct decoding of the concepts and to the establishing of logical relations as a result of discussions, disseminations specific to team activities.

- If in the control group there were students who have got grade *Insuficient* for *Item 2* and *Item 3*, all students in the experimental group have passed. The results were very good 50% for *Item 2* and 32.14.% for *Item 3*.

The results that we have registered must be correlated with other studies on the subject, in which to consider the other cognitive aspects as well as the relations between them. It is necessary to take into account the age and gender of the learners forming teams, their previous experience. These variables (eg. children, young or adult people, male or female predominance etc.) can influence the results and require monitoring. We also believe that we need a larger sample of students whose specialization is different, so as to make better cooperation and to practice different tasks in terms of cognitive demands.

Conclusions

Effective teams are characterized by the high spirit of cooperation, by the emotional fusion of the members, through a positive ethos and a desire to remove tensions and possible socio-emotional blockages. Also,they develop relationships and increase motivation at work, create synergy in solving problems, provide emotional, theoretical and practical support, and promote responsability. Team activity can lead to better results on a cognitive level,

when people are working cooperatively. We are concerned about these issues and consider that they affect performance in learning.

In order for students to achieve excellent results and develop harmoniously, their teachers must know what is genuine cooperation and to teach them to work together. Therefore, in this study we have insisted on encouraging teamwork of students-future teachers and we have concluded that the lack of training practice on cooperative learning impedes forming collaborative skills which influence (to a lesser or greater extent) performance. The group or team work is supported by an appropriate learning style that can be formed and strengthened through specific methods and tools.

The normative and intergroup context, prejudices, behavior styles affect the team activities carried out and this is reflected in relationships. Team activity should be based on cooperation as a way of building knowledge (initially empirical, subjective, truncated, eclectic) and obtaining higher performance (both individually and collectively). The results that the students we have worked with have achieved proved to be high on a cognitive level, which entitles us to say that by encouraging teamwork and by providing as many collaborative training situations as possible contribute to their intellectual development . Even though we have not focused specifically on studying the effects on the other dimensions of the personality development, we have seen, at the end of the training program, an enhancing of the relational, emotional and attitudinal aspects.

Schools fall and rise, remain anchored in the traditional or adapt to the new requirements depending on what is going on inside them, in relation to the quality of the teamwork that occurs between their walls.

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