INTERACTIVE TEACHING IN THE CLASSROOM

by Mario Comoglio

We can say that the teaching and learning environments in schools have significantly changed in the last twenty years. I remember when years ago I was responsible for holding teacher courses on Cooperative Learning. Some of the participants often criticized the methods and strategies of this methodology by saying: "I understand why you are speaking about this: this is a left-wing age". Instead, others used to say that it was useless to go back to a methodology coming from the 1968 student protest movement that was obsolete and leveled people out. Although these doubts have disappeared, after two decades, difficulties are still encountered to adopt an interactive teaching methodology. In spite of some diffusion, many people still confuse group works with cooperative learning and recognize the quality of interactive teaching for class management, but not for learning purposes. Some have a positive opinion, but also some doubts on the possibility to reduce teaching and learning time.

Doubts are founded in some cases, but it would be necessary to have a more accurate knowledge of the theoretical foundations and profound motivations of the strategies and techniques for interactive activities in order to understand better when and how interactive methodology can be effective. Interactive activities must be gradually introduced in the classroom because, in spite of the higher efficacy of these methodologies compared to others, and in spite of our mental inclination and disposition to act in a collaborative way, application conditions are not automatic.

In order to solve some of these problems I will try to focus on some aspects, asking the following questions.

- What do we mean by interactive teaching methodology?
- Which are the effects and the advantages of such a collaboration interaction in the classroom?
- Which are the reasons for an interactive teaching methodology?
- Which are the efficacy conditions?
1. THE INTERACTIVE TEACHING ENVIRONMENT IN THE CLASSROOM

When we talk about interaction in the classroom we refer to all forms of dialogue that may occur in the classroom in order to maintain and/or increase student learning. In this perspective we can include interaction forms between teacher and students and amongst students. We specifically exclude the forms that aim at maintaining a good relational climate or correcting a negative situation. These are teaching interactions for class management. It can be a discussion promoted by the teacher on some rules or behavioural routines in the classroom, or a discussion aimed at solving a conflict or unacceptable behaviours (for example, a severe lack of respect or the non-compliance of an agreement).

Of course, the situations cannot be clearly distinguished and separated. A good teaching interaction for learning must have the support of a good favourable interaction for class management and vice versa good class management is founded on a good teaching method. The distinguishing criterion is the intention of the interaction, which can be directed to improve either the relation between the people in the classroom or learning. Therefore, we classify a learning interaction as a teaching interaction, while keeping in mind that a learning interaction can indirectly improve the relations between people. For example, students placed in groups to solve a problem or complete an investigation may improve their relations during the activities, becoming more inclusive.

Two additional distinctions must be made within such a general division:

a) Interactive teaching with poor/high involvement between teacher and student

b) Interactive teaching with poor/high involvement between student and student

1.1. Interactive teaching with poor/high involvement between teacher and students

It can be stated that there is no teaching without interaction (except for cases in which students receive no stimulation or explanation from the teacher). For this reason we speak about "poorly" interactive teaching. In general terms we can classify as such the teaching that is traditionally defined as "transmissive". Its characteristics are known: the teacher teaches and explains the contents directly; makes things simple in order for the students to understand better; provides summaries, uses closed questions (for example, yes or no questions, using expressions like "Did I explain myself?", "Was I clear?") to check the understanding and the acquisition of contents; repeats the contents that have not
been understood several times in the same way; students are passive and receive the contents they will memorize.

On the contrary, a "highly" involving teaching interaction occurs when teacher and students create a positive atmosphere in which each person can express his/her opinions and understandings freely, after establishing the basic rules used during the interaction. The teacher organizes the participation format (or different forms of direct and group interaction), plans and guides the dialogue with students, keeping in mind explicit precise objectives. Teacher and students listen to each other and exchange ideas, negotiate meanings and perspectives, consider alternative viewpoints, possibilities and hypotheses, explicitly reasoning to achieve a common understanding. The teacher builds ideas, creates a link with the existing knowledge, provokes students with open questions that make them reflect, stimulates the exchange of ideas, provides feedback that requires additional reflection, stimulates students to be active by speaking their opinion out, creates a comparison and a discussion with the entire classroom, invites students to argue their positions, integrates and recalls metacognitive reflections on the purpose, meaning and usefulness of what students are learning. Teachers and students build ideas by connecting them according to consistent lines of reflection and investigation.

1.2. Interactive teaching with poor/high involvement between student and student

Interactive teaching may avail itself of collaboration and groups, but it is not always highly involving. Collaborative teaching with "poor" involvement requires simple products that may be carried out also individually; it does not commit the resource of all; the individual responsibility in the task is neglected, group collaboration has no clearly significant cognitive and educational objectives; it does not engage the student's mind in high cognitive processes. The teacher gives tasks that must be carried out together without paying attention to the quality of communication and interaction between group members; alternatively, the teacher gives the responsibility of directing the group activities to a member of the group.

Differently, collaborative teaching with "high" involvement has clear cognitive and educational objectives; engages the students in the use of high cognitive, metacognitive and social processes; requires the use, application and acquisition of knowledge and processes; stimulates an open sincere dialogue; gives less freedom to the students to leave the task or topic.

2. WHICH ARE THE EFFECTS AND THE ADVANTAGES OF A
COLLABORATIVE INTERACTION IN THE CLASSROOM?

Having identified two types of teaching interactions (teacher/class) and group collaboration, we provide some information on these two situations.

2.1. Effects of teaching interaction between teacher and class

In general, research seems to be more favourable to class situations with a more dialogical interaction. Students have the opportunity to express their understandings and misunderstandings; they can think aloud, ask questions and explore ideas without being immediately evaluated as “wrong” or “right” by the teacher. An interesting literature is available to guide teachers to use this type of teaching in the classroom (Alexander, 2001, 2008; Dawes, 2008, 2012; Mercer, & Littleton, 2007; Nystrand, 1997; Scott, 2008). Classroom education must give student the opportunity to think collectively, co-building knowledge and understanding and solving problems together.

A study on teachers in Mexican classrooms (Rojas-Drummond, Mercer, & Dabrowski, 2001) demonstrated that the students with the best learning results came from teachers that avoided the predominance of closed questions, organized exchanges of ideas, created the conditions for mutual support, encouraged students to be more active and speak out during class events. The teachers that were able to carry out a dialogical interaction (listening, reasoned understanding, research for consensus, shared understanding) (teaching method defined as HighScope) obtained better results than teachers with a more traditional teaching approach. The results also showed that a dialogical collaborative structured lesson can help students to develop problem-solving capabilities, learning strategies and better understanding.

The same was noted by Walshaw and Anthony (2008; see also Anthony & Walshaw, 2007, 2009). According to the two New Zealander researchers: “the work in the classroom is enriched when the discussion provides for co-building maths knowledge through a respectful exchange of ideas” (page 543). While they say that there is not clear methodology or a well-defined sequence of steps, dialogue must involve students according to the following principles: to demonstrate attention and care while listening to students; to provide the opportunity to give a meaning to concept independently and collaboratively; to facilitate dialogue; to model the meaning of the words and terms used by the students; to choose tasks and activities that lead to the understanding of concepts and ideas; to create links between mathematical concepts and everyday experiences; to choose tools and representations carefully; to demonstrate a good understanding of the subject.

Halfway between the teacher and the group interaction is the investigation by
Webb, Nemer and Ing (2006, also see Webb & Farivar, 1994). According to them, the differences between teachers in the processing of solutions to problems in a group correspond to the capability of students to "ask for and give help" or "ask questions" that required reflection, and not a correct answer. In other words, the discussion of students in groups corresponded to the type of discussion demonstrated by the teacher during the interactions with the students. If teachers do not increase their awareness of how they can speak and work together, or do not provide models and guidelines, it is unlikely that students will develop and apply significant skills for collective thought.

2.2. Effects of active teaching interaction between student and student in a collaborative way

Some researchers have studied the effects of teachers that guide students in “collaborative reasoning”. For example, Retznitkaya, et al. (2001) involved 10-11 years old students, forming three classes that participated in collaborative reasoning discussions guided by the teacher on literary texts for 5 weeks. The students were compared with three similar classes that were not engaged in Collaborative Reasoning. At the end of the activity the students were invited to write persuasive essays.

Collaborative Reasoning is an approach to discussion that aims at providing elementary students an opportunity to become skilled in reasoned argumentation. During Collaborative Reasoning students participate in small groups in discussions on controversial problems raised by the texts they have read. The texts include interesting topics for children that stimulate a reflective lively dialogue. A distinctive characteristic of CR discussions is open participation. This means that students must not raise their hands to speak. They communicate freely without being invited by the teacher. The reason for open participation is that "higher levels of productive behaviour in students are probable if there is equilibrium between the interactive rights of teacher and students" (Au & Mason, 1981, page 150).

In a CR discussion the students decide what to discuss and when to speak. The role of the teacher is to promote reflection and collaboration of students (Anderson, et al., 1998). The characteristics of the teaching strategies are:

a) To stimulate students to reasoning and taking a position,
b) To demonstrate reasoning processes by thinking aloud,
c) To challenge students with opposite ideas,
d) To recognise good reasoning,
e) To summarise what students have said
f) To use the vocabulary of critical reflection.

The specific intervention of the teacher depends on the control level of students on reflection strategies, on group dynamics and on the direction of the discussion. The
emphasis in the discussion is not about reaching an agreement on the problem, but about acquiring experience in the process of reflective judgment. The ultimate purpose of Collaborative Reasoning includes "inculcating values and metal habits to use a reasoned argument as a tool to choose between competing ideas" (Anderson, et al., 1998, page 172). "CR discussions offer students an opportunity to expand their repertory of answers to literature while learning to reflect in a reasoned way and explore different viewpoints urged by their readings" (Waggoner, et al. 1995, page 583).

The students of the classes where CR was employed and essays were used for evaluations showed a significantly higher number of pertinent arguments, expectations, counter-arguments, objections, formal reasoning elements and use of information from the texts.

Although many investigations of this type use interactive modes, one of them has become very popular. The research activity has been very intense and meta-analyses have been carried out to summarize the large amount of data. The last two meta-analyses are reported below.

The first meta-analysis (Roseth, Johnson, & T. Johnson, 2008) collected 148 studies representing 70 years of research on 17,000 students (from 11 to 15 years old) of 11 countries. The results of the investigations compared competitive, individualist and cooperative modes by checking learning and improvement of interpersonal relations. The learning results were much better in the cooperating mode than in the competitive individualist mode. The meta-analysis also had a second hypothesis. It checked whether the quality of interpersonal relations was better in cooperative mode compared to the competitive individualist mode. It is well known that the development of positive constructive relations in the classroom tends to be related with a positive behaviour in school (school competence, involvement and personal esteem), while this data is correlated in an inverse relation to negative behavioural models (violence, drug abuse, teenager pregnancies, depression). Also this second hypothesis proved to be true compared to the competitive individualistic condition: the students in cooperative classes had better interpersonal relations than students in competitive individualistic conditions. The third hypothesis intended to check whether the cooperative structures were associated consistently to a positive relation between results and interpersonal positive relations. Also this hypothesis proved to be true, indicating a strict relation between interpersonal relations and school results.

The second meta-analysis (Kyndt, Raes, Lismont, Timmers, Cascallar, & Dochy, 2013) collected 65 articles published in the last 10 years (after 1995). The intention of the authors was to check whether the positive results detected by this learning mode are still valid today. In view of the multiple definitions of this methodology, the meta-analysis adopts the definition given by Cooper, Prescott, Cook Smith and Mueck (1990): "Cooperative learning is a technique that requires
students to work together in small stable groups on a structured learning task”. This form of teaching was compared with what traditionally happens in a direct teaching mode to the entire class.

The results were detected with reference to learning results, mental attitudes and perceptions. Learning results refer to the learning of knowledge and skills. Mental attitudes are the "mental and neural representations organised through experience that exert a directive or dynamic influence on behaviour” (page 137). Perceptions are defined as "the way in which things are seen, understood or interpreted” (page 137), i.e. the way in which people perceive a discipline within cooperative learning. The width of the effect was positive for all these variables, but the most significant results were obtained for learning. Amongst the different cooperative learning methods, the best result was determined more by the prize than by the interdependence.

3. THE CAUSE OF THE MOST POSITIVE CONDITION OF TEACHING INTERACTION BETWEEN TEACHER AND STUDENTS AND AMONG STUDENTS

The positive effects of the teacher/student condition (the same being possible also for groups, as illustrated below) refer to the social nature of our brain and its capacity of linking with the brain of others, learning from the cognitive development of the individuals before us. The first one to anticipate a theoretical model of this passage was Vygotskij. According to him, social development precedes individual development and language is the means between the social and the individual level. However, language has the power to become intra-mental, i.e. a processing tool. We all know that during individual playing activities children take on the role of a mother or an adult while playing on their own or with another child.

Evolutionary psychologists believe that the thought and the individual mind have evolved in such a way to assume a social characteristic. The mind not only has developed as a tool for survival against the others (Darwinian individualistic hypothesis), but also as the possibility to address complex situations together with the others in order to find a solution for the mutual benefit of all. Our thinking capability allows every new generation to connect to the past experience of its community and enjoy survival advantages versus competitors, which are derived from such a connection. This is a recognition of the link between intermental and intramental, as well as the extraordinary importance of language as connection tool between the two worlds.

Moreover, Vygotsky observed that learning and development require a transition from the social context to the individual understanding: knowledge is
encountered first in interactions with people and then interiorized. Language is the key tool of a cultural transmission and a psychological mediation. Being a cultural instrument, language allows for transmitting knowledge to future generations. At the same time it allows for thinking, i.e. organizing thoughts, reasons, planning and reflecting on actions. Through the interaction with other people, children are informed about the experiences of the others, but also about the processes that can be operated on them. By communicating each human being becomes an active member of a community and shares knowledge, experiences and processes.

However, some investigators have considered this expression of the theory to be too generic. In fact, it seems to be compatible with different interpretations. Can each form of language or interpersonal communication improve knowledge (knowledge) and the psychological capabilities of knowing (processes)?

According to a first minimalist interpretation, interaction consists in an exchange of ideas and information or in communication of processes to be applied in order to address problems and find solutions. In this case the only role of language is to transmit information with a certain level of accuracy from one mind to another.

According to another interpretation, interaction can be configured as a dialogue to coordinate mental efforts, reason on ideas productively, build strategy collectively in order to address a task together with other people. In this case interaction improves individual capabilities, devising a better way of doing things together with the others compared to what could be done individually. The improved group performance would reflect the so-called “bonus effect from the group”, which is obtained because the performance of a group is better than the performance of the best member of the group (this thesis being supported by the modern research on collective intelligence”). Woolley, Chabris, Pentland, Hashmi and Malone (2010) pointed out that group success is not strongly related with the average intelligence of the group members, but it is related with the average social sensitivity (capability of being empathetic with the ideas and the emotions of the group members) of the members and with the equal distribution of the speaking time during conversation. Collaboration also allows discovering strategies and processes as viewpoints that may be used in other occasions by the group members. Moreover, collaboration also allows for co-building new knowledge, as demonstrated by Smith, Wood, Adams, Wieman, Knight, Guild, & Su, (2009): students that gave wrong answers to questions were much more correct when they answered an (isomorphic) question after a discussion with their classmates.

According to a third interpretation, dialogue promotes a real mental development of students. If the interaction or the group requires reasoning and explaining, the argumentation promotes the critical meta-cognitive awareness of the students. By discovering and expressing different viewpoints, the students increase their awareness; confrontation and contradiction stimulate mental
capabilities. Making hypothesis, asking questions, reasoning, comparing, deducing, abstracting will educate to a “reflective attitude”; will develop an intramental “dialogue” capability; will help to become better at evaluating possible problem-solving strategies in a critical way, monitoring and adjusting the personal problem-solving method when tasks are addressed individually.

Some researchers have focused their attention on this aspect, recognizing that a certain kind of dialogue has the power of changing the intra-psychological structure. An example of this was described, when evaluating two groups of teachers that obtained different results having a different type of dialogue with their students. The competence and independence in problem-solving and reasoning were affected by the way teachers interacted with students (Rojas-Drummond, Mercer, & Dabrowski, 2001). In the best classes teachers not only asked questions to recall the knowledge of students, but also led the development of reasoning to understand. Rather than transmitting the contents directly, the teachers encouraged the students to make their thought explicit by means of their process to reach a solution; moreover, they encouraged them to be more active in the various class activities and exchange ideas with the entire class.

Allowing the students to assume a proactive role in the class discussion is important to promote dialogical interactions in teaching and learning processes. Alexander (2008) also indicated that the simple freedom to speak and express oneself is not effective and does not produce the desired effects. For this reason he suggested that teachers should guide students by giving them some "dialogue rules" that stimulate and extend their reflection, while improving learning and understanding. Mercer and Dawes (2008) conclude their investigation by affirming:

"The research showed that the simple division of the students in groups, leaving them alone in problem-solving, is not sufficient to ensure the use of cooperation and dialogue for a good effect. However, the research also confirmed the first conviction of Douglas Barnes, according to which conversation between students gives an important contribution to their learning. There is no paradox: the entire class, the discussion guided by the teacher and the activities founded on the group are complementary, not alternative learning modes. The students need an interaction between the guide of the teacher (activities guided by the teacher in the classroom) and the work of the group (when they can try using the language to solve problems together). For some students, school can be the only opportunity to learn how they can participate in a focused reasoned discussion in order to develop important skills in terms of language and reflection. It is important that teachers offer this opportunity in three main ways. First of all, teachers should play an active role, guide the use of language by the students and model the ways used for a collective reflection. In part this is the case of teachers putting into practice what they say. If the teacher wants students to ask for and be given reasons, he/she should do the same thing during the discussions with the entire class. If during the group discussion, the teacher wants the students to deal with insecure ideas respectfully, to listen to different viewpoints and to process ideas in such a
way that they are understood by everybody, the teacher must behave in the same way with
the class. Teachers should ask students to give the reason for their opinions; they should
involve them in extended discussions and encourage them to understand that "answering a
question does not simply mean to give the right answer". Plenary sessions can be used to
help the students to reflect on their activities and consolidate their learning on the use of
language. Secondly, teachers should establish an appropriate set of basic rules for class
discussion, building in students the awareness on how language can be used. The rules will
become part of the common knowledge of the class. In third place, teachers need to ensure
that group activities are designed well in order to stimulate a debate and a collective
reasoning. The concept of 'research community' is important. The good activities require a
careful consideration of different problem-solving models, or an evaluation of different
explanations in the tasks that are significant for the students. The activities should be
designed on the common knowledge of the students, as well as created to go beyond the
existing knowledge, considering the new ideas and the research for more useful
information" (pages 70-71)

This is basically shared by the cooperating learning movement. Diversities are
certainly due to the different origin. The interaction between teacher and student
used constructivism and Vygotsky as a point of reference. However, also
Cooperative Learning has been favorably considered when these perspective are
translated into practice. Nevertheless, the matrix of Cooperative Learning is the
group, according to the interpretation given by Kurt Lewin, for whom the
distinctive element of the groups is the positive dependence, as well as social
relations. According to school experiences, social relations are especially influent
on school results. The meta-analysis made by Roseth, Johnson, e Johnson (2008)
ends by saying:

"This study shows that if teachers of teenager students can structure the school
objectives of the students cooperatively (in opposition to individually and competitively),
they will find out that:

a) the students will have good results,
b) positive relations will be created,
c) high results will be associated with positive relations between students.

Alternatively (and equally advantageously) the study shows that when teachers can
structure the school objectives of their students cooperatively (in opposition to individually
or competitively), the students will create positive relations between them and will achieve
better results. Until the research finds no evidence in contrary, this shows that there is a
mutual causality”.

This conclusion indicates that, being two the causes of the positive effects, two
will be the fundamental tasks of a teacher: to define cooperative objectives for
students (the positive interdependence) and the attention to social relations.
4. HOW TO APPLY AN INTERACTIVE METHODOLOGY IN TEACHING AND LEARNING ACTIVITIES

For lovers of these topics, 186 techniques are available at the following Web site:

The previous reflection should help to meditate on their use. I would like to make some suggestions:

*Never use a technique and never apply a group activity or interaction without a clear objective and purpose.* When the objective and is clear, stop and perceive "empathically" whether a certain activity or work structure seems to guide the students in the classroom and obtain the desired purpose.

*Do not improvise.* Improvisation surely has elements or aspects that prevent the achievement of results because of the lack of preparation and definition (except in case of a multi-year experience). Having said that, we must be aware that it is impossible to predict everything (especially in the interaction between teachers and students). Dialogue starts from the answer to a previous question, which is impossible to predict exactly. The diverging thought of students can always be a surprise. Experience and practice will be a great help to do better and better. Equilibrium between improvisation and planning is necessary. It is very useful to prepare the questions and imagine the answers given by the students. This avoids being totally surprised. You should not forget that interaction does not give a lot of time to think and meditate (especially by the teacher). The continuation of an answer must be almost immediate. The situation is different in case of students. The teacher must always allow some time for reflection before having an answer to the question.

*Proceed gradually.* Many variables are involved both in interactive dialogue and in group works. Questions, listening, reflection, answers, mutual respect, attention to the development of reflection, time monitoring, order, the starting point of the students, the previous knowledge, the expressive capabilities, the class climate ... Before starting a collaborative dialogue and a collective thinking, the teacher must think about the "existing position" of the students and about how he/she can gradually take them to a starting point from which a significant interactive dialogue can be created. Freedom of expression must not give way to disorder, saying things that can disturb reflection and concentration in the classroom. The teacher must be able to keep reflection within the boundaries of the topic, although the answer
given by a student can take the discussion away. For this reason it is important to make a "synthesis" when necessary, to mark a "co-building" point.

It is part of the teacher's profession to "model" the behaviour of the students, as well as their reflection. As we mentioned with reference to the thought of some researchers, the possibilities of a reflective collaborative dialogue are in the nature of human beings, although they need to be educated. A list of the Basic Rules to be respected is an interesting guideline. With the Exploratory Talk and Thinking Together methodology Neil Mercer offered an interesting path that has shown some positive effects:

- All important ideas must be shared
- All group members are invited to take part in the discussion
- Opinions and ideas are respected and taken into consideration
- Each person must make his/her opinions clear
- Challenges and alternatives are made explicit and negotiated
- The group attempts to reach an agreement before taking a decision or acting
  (Exploratory Talk)
- sharing ideas and listening mutually;
- considering the words or drawings made by partners;
- respecting other opinions;
- motivating ideas;
- presenting ideas and productions orderly and clearly;
- in case of disagreement, ask “why?” or give a reason for disagreement;
- only work on problem solving (i.e. do not surf the Internet);
- try to contribute a solution, before asking the teacher to check the answer.
  (Thinking Together)

Avoid group activities without a structure acting as "scaffolding". Certainly, the purpose and objective help to finalize the activity. However, it is also important to establish the exact form of the product to be achieved, to have the necessary materials available, to indicate responsibilities, to be ready to support the difficulties, to reflect in order to correct mistakes and improve.

In my opinion, the creation of a learning interaction in the classroom is not easy, but not impossible. The secret can be to have a clear theory in mind in order to guide actions and interpret the interactions, accompanied by the desire for continuous improvement in the professional practice.

5. REFERENCES


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