

Active Didactic Methodologies in the High School as Effective Education Strategies to Animate Students' Participation

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Abstract: The didactic methodologies are the study of the methods of pedagogical research and also the study of the methods of teaching-learning processes: these are strategic teaching actions, made flexible by the teacher on the basis of concrete training situations and the particular characteristics of the students. "Active methodologies" mean those teaching strategies that put students at the center of their learning process, involving their creativity and their sense of initiative, naturally, without neglecting the curricular contents. A classic frontal lesson, on the contrary, focuses on not the student but the contents or, even worse, the teacher himself; it does not stimulate the creativity of students who, however fascinated, have only a passive role within that educational context. The "active methodologies", in particular "the flipped classroom", on the contrary, require a direct participation of the student, through the activities that the teacher from time to time identifies as training.

Keywords: Active didactic methodologies, flipped classroom, direct participation, teaching-learning processes, personalized education.

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I. INTRODUCTION

The frontal lesson, in its various meanings, is certainly the most frequent way of teaching in Italian secondary school: this does not mean that it is the most effective method for every discipline and for every learning. On the contrary, in all disciplines (even in the more theoretical ones) different methods should be activated:

- ◆ to develop different and more autonomous learning processes not only for reception, but also for discovery, action, problems, etc..

- ◆ to guarantee a customized training offer: the student who does not learn by a method, can learn with another.

- ◆ to promote and / or consolidate the interest and motivation of the students : after a long time each method can be boring especially for an adolescent. This does not mean must be leave the frontal lesson , but we simply believe this is the time to limit it to small number of didactic contexts, and not raise it to rank of "queen strategy" in the which presence the others or disappear or become its maids . Undoubtedly the frontal lesson can still be very profitable, but only if combined with other educational solutions; we also believe that students can be less bored with an hour of "active" lessons and more participants in their own learning process

So we can argue that every topic, and every class context, has a more effective strategy than others, and both the teacher and the class must to choose from time to time the most suitable. Without any doubt continuing blindly with the frontal method will lead to increasingly poor results and to an ever more evident drop in attention and motivation in the classroom. Active techniques are the procedural activities that actively involve the student in the learning process and these techniques used in educational activities are characterized by:

- Centrality and the "lived" participation of the students because they involve the whole personality of the student.
- Constant and recursive control (feedback) on learning and self-assessment throughout the process, so not only at the end and not only by the teacher
- Training in situation
- Group training [1].

The proposed techniques are placed within four groups of active techniques:

1. Simulation techniques, in which we find role playing for the interpretation and analysis of social behaviors and roles in interpersonal relationships and the action maze for the development of decision-making skills and procedural;

2. Situation's analysis techniques that use real cases: the study case to develop both the analytical skills and the methods of approach to a situation or a problem; the incident, where decisional skills are added predictive;
3. Professional reproductive techniques such as demonstrations and exercises: they aim to refine technical and operational skills by reproducing a procedure. They are complementary and require the decomposition of the procedure in operations and in phases to be placed in succession and to be verified at each step;
4. Cooperative production techniques, among which we find the brainstorming method (brains in storm) for the elaboration of creative ideas in groups and cooperative learning, for the integrated development of cognitive, operative and relational skills [2].

In detail, we consider some of these methodologies used in the school environment:

INTERDISCIPLINARITY is an educational methodology which consists in examining reality in the interrelations of all its elements, thus overcoming the traditional sectoral view of the disciplines. For example, the analysis of a social-historical environment is carried out by involving in an interactive and dynamic way more disciplines, such as history, geography and social studies, in such a way as to favor a broader and deeper global knowledge in the pupil. , therefore, more significant.

ROLE PLAYING (play or role interpretation) consists in simulating behaviors and attitudes generally adopted in real life. Students must take the roles assigned by the teacher and behave as they think they would really behave in the given situation. Therefore, this technique has the objective of acquiring the ability to play a role and to understand in depth what the role requires. Role playing is not a repetition of a script, but a real performance of a subject. It concerns the behavior of individuals in interpersonal relationships in precise operational situations to find out how people can react under such circumstances. The teacher is required to respect the students in their choices and reactions without judging. Like any sensitization technique used for training purposes, role playing must have structured sequences and must end with a verification of learning.

The **ACTION MAZE** technique (action in the labyrinth) has also been extensively revised with the advent of networks and navigation techniques. In this case the student does research and, at each node, must evaluate the importance and the meaning of the new information, making continuous decisions on the roads to be taken or discarded (internet is a real labyrinth). Alongside decision-making skills, the labyrinth technique on the net also requires extensive self-assessment and guidance skills

CASE STUDY consists in presenting to the students a detailed description of a real, frequent or exemplary situation. With it we intend to develop in students the analytical skills necessary to systematically deal with a complex situation of which all the fundamental indications are given. The situation to be examined may also concern a problematic case, but we must not forget that the goal of this technique is not to solve a problem, but to learn how to deal with situations and problems, to identify them and to position them. The description is given to the students who first study the case individually and then they discuss it in a group, thus multiplying the alternatives to approach the case itself.

Alongside the development of analytical skills, the case study method also presents other important training aspects, if used as a group technique. The interaction between students, in fact: favors the knowledge of other people, discouraging them from issuing simplistic judgments against them; it allows us to understand how the same situations or problems can be evaluated differently by different people; allows you to break down easy generalizations; it sensitizes and trains interaction and discussion, creating conditions that facilitate a better mutual understanding; finally, it highlights the difficulties presented by thinking about a real problem and arriving at a possible group solution.

At the beginning of the experiences with the case study the students are eager to know the answers to the various questions and the solutions adopted in reality. After a while they understand that it is more important to learn the process of analysis to arrive at the solution than to "guess" the solution itself.

The **INCIDENT** can be considered a variant of the case study, although it differs from it both for the object of study and for the teaching technique. The object of the incident, in fact, is indeed a real situation, but it is an emergency situation, about to explode, such as it can become a road accident. Therefore, with the incident, students must demonstrate analytical skills, and not only to identify strategies of approach, but above all to develop decision-making skills to favorably overcome the emergency. Also in the incident, as with the case study, the teacher carefully prepares all the elements related to the situation in order to make a clear and concise presentation to the students; the design of the intervention, therefore, is similar to that of the cases. In the incident, however, the teaching technique varies. The description does not require a few minutes because the material presented to the students is deliberately missing many elements.

BRAINSTORMING (mental assault or "brain storm") is a group creative technique to bring out ideas to solve a problem. We organize a meeting in which each participant freely offers solutions of all kinds (even bizarre, paradoxical or with little apparent meaning) to the problem, without any of them being criticized in any way. Criticism and possible selection will only intervene later, after the brainstorming session. The main result of a brainstorming session may consist of a new and complete solution of the problem, a list of ideas for an approach to a subsequent solution, or a list of ideas that will be transformed into the drafting of a work program

to find afterward a solution: it derives directly from the method of the *Quaestiones disputatae* of the medieval Universities. Typically, during a brainstorming, the suggested ideas are, from time to time, reported on blackboards or large sheets to remain visible to everyone during the session

COOPERATIVE LEARNING is a learning-educational method of learning consisting of cooperation among students who learn in small groups, helping each other and feeling co-responsible for the mutual path, making their knowledge and skills available to the group. Learning in groups is very effective not only on the cognitive level, but also as regards the activation of positive social-relational processes. In fact, each component increases its self-esteem, is responsible for learning processes, grows in social skills, learning to cooperate to achieve a common goal. The teacher assumes the role of facilitator and organizer of the activities, structuring "learning environments" in which the students, encouraged by a positive relational climate, transform every learning activity into a "group problem solving" process, achieving objectives the whose realization requires the personal contribution of everyone. Depending on the activity to be carried out, the teacher can create the groups himself, which may differ by level, tasks, electives, mixed, or leave the students free to join in a group.

CIRCLE TIME is considered one of the most effective methodologies in socio-affective education. The participants are arranged in a circle with a conductor who has the role of soliciting and coordinating the debate within a predetermined time period. The succession of interventions according to the order of the circle must be strictly respected. The director assumes the role of privileged interlocutor in asking questions or providing answers. The circle time facilitates and develops circular communication, promotes self-knowledge, promotes the free and active expression of ideas, opinions, feelings and personal experiences and, finally, creates a climate of serenity and sharing facilitating the establishment of any new work group or preliminary to any subsequent activity.

Heuristics is the art of research, that is, that part of science that deals with discovering facts, what happens. In pedagogy the **EURISTIC METHOD** is also known as the method of discovery and consists in gradually leading the pupil to discover for himself what he wishes to know through constant and active involvement in the paths of research and interpretation. In this way, the student mastered the acquired knowledge and is able to use it in the following learning phases.

The purpose of **ACTION RESEARCH IN THE CLASSROOM** is change, of people, of relationships, of context. Methodologically, the research-action cycle includes the following phases:

1. Identification of the problems to be solved, of the causes of those problems, of the contexts and of the environments in which the problems are located, of the available resources and of the constraints that force them to make certain choices.
2. Formulation of change hypotheses and implementation plans.
3. Application of hypotheses in the context-objective of the formulated plans, (no longer speak, but act).
4. Evaluation of changes occurred and review of projects and plans adopted.
5. Deepening, institutionalization and widespread dissemination of applications with positive evaluation.

With the action research the students understand the complexity of the systems in which man intervenes, the fluidity of the design hypotheses and in particular: the mutiny of the variables: when the human factor intervenes it is very difficult to isolate and block the variables; the partiality of the researcher's point of view and the consequent need to compare all the points of view; the relativity of the individual is no longer a limit, but is transformed into value if all the actors are researchers; the need to immerse yourself in the studied situation by doing research on the situation-problem: the student does research on himself; with the research-action we are not external, detached, but involved, co-responsible; the taking charge of heuristic research paths

WALKING IN THE DISTRICT is a participatory method that can be used as a technique of "active listening" of the territory. It consists in the recognition of the importance of a knowledge that is not only ordinary, but also perceptive, active, spatial, which emerges and takes shape from the opinion of a person. In order for the district walk with the students be effective, it is important that it be preceded by an accurate preparation phase, in order to provide the tools necessary to observe with greater accuracy the context in which they live. The preparatory phase will be aimed at ensuring the maximum possible involvement of the students during the walk.

QUALITATIVE RESEARCH ON THE FIELD: the INTERVIEW is defined as "Exchange between two people, one of which seeks, by asking more or less strictly fixed questions, to gather information or opinions from the other on a particular topic"[3]. The role of the interviewer will be to direct the interview through active listening, in the context of a communication that must have explicit objectives. The interviewer must show his respect for the interviewee, who must feel accepted and not judged.

DIGITAL STORYTELLING, or Narration realized with digital tools, consists in organizing contents selected from the web in a coherent system, and students are invited to invent a story whose composition, without doubt, must show the study of disciplinary contents such as the life of an author or historical character, inviting students to imagine the "fiction" scenarios of their invention.

PROBLEM BASED LEARNING The students are invited to solve a problem based in part on known disciplinary content, partly on content that will come out during the resolution itself, with the support of the teacher, or by the students themselves alone or in groups. The advantage of this, as of other "active methodologies", is that there is no univocal way to respond to the given problem, but a multiplicity of solutions, some more, others less effective, that the students can find. In such a context, even the error becomes significant because it, far from being the most serious thing that a student can commit, simply becomes a less or nothing effective way to respond to a training context.

On the other hand, it is honest to say that not all "active methodologies" are adequate for all contexts; for example, cooperative learning is not suitable for dealing with problems of immediate solution; digital storytelling is not suited to markedly technical-scientific disciplines

The "active methodologies" are historically and profitably activated, in Italy, especially in kindergartens and primary schools; instead, they go into the background in secondary school of first degree, until they disappear in high schools. It is precisely in these contexts that such methodologies should be incentivized and promoted. Many disciplines that have undergone an "apparent aging" in recent years, such as philosophy and classical languages, because of the antiquated teaching system, could benefit from many advantages. The best way to safeguard these disciplines today is only and only that of innovating them deeply [4].

II. OBJECTIVES

The flipped classroom" or "inverted classroom" method [5] was born in the United States about seven years ago, thanks to the initiative of two science and chemistry teachers, Jonathan Bergmann and Aaron Sams [6], who teach in a high school in Colorado.

The two teachers were wondering how they could do to keep their kids from falling behind, when one day Aaron found the answer in a technology magazine in which software that allowed you to record voice and annotations over a PowerPoint presentation. The students looked at the recorded lesson at home and arrived in the classroom already prepared, ready to make laboratory experiences, but also with questions to deepen what they had seen the day before.

The basic idea of the "flipped classroom" [7] is that the lesson becomes a homework while the time in the classroom is used for collaborative activities, experiences, debates and workshops. In this context, the teacher does not take the role of leading actor, rather becomes a sort of "mentor", the director of the pedagogical action. Over time, at home, the video and other e-learning resources are widely used as content to be studied, while in the classroom students experiment, collaborate and perform laboratory activities. In fact, "flipping" is not so much a pedagogical approach, as a philosophy to be used in a fluid and flexible way, regardless of the discipline or the type of class. It is important that the time "gained" in the classroom thanks to flipping, is used optimally and that the resources used by the student over time at home are of high quality, as well as being calibrated on the level of knowledge up to that moment achieved by the students. A library of content integrated with online videos based on quality and accessibility is the best starting point for a good final result

The choice of this further didactic methodology, moves from the following considerations:

- allows a radical transformation of activities, relationships and expectations "overturning" the two key elements of the educational experience: time at school and time at home;
- allows the improvement of educational interactions in the classroom, thus optimizing time at school;
- optimizes the teacher / student relationship: more time to devote to those students who need more support.
- develops and strengthens peer learning and autonomous learning

The high quality content of video resources is an essential condition for the flipping model. It is therefore necessary to draw on archives of selected resources. For this purpose the role of the mentor becomes crucial, to indicate the most authoritative sources to which the learners will have to refer.

The Italian school should be cut out around the students. Thanks to the flipped classroom, each student becomes the protagonist of his training. Who needs to look at the lesson two or three times, can do it quietly, while those who are more gifted can deepen. The teacher becomes a tutor, a facilitator, a guide for the various laboratory, group or individual experiences. It can set up recovery or consolidation for those in need, but also challenge the excellence with something that really values them. In addition, before starting the lesson, a quick brainstorming is useful to point out again what was expressed in the video showed to students. A student in difficulty, alone, at home, in front of a math problem, a Latin version of grammar, is very likely to e This method reduces the sense of inadequacy and prevents school drop-out. Over time, between external resources and personalized resources, the pupils are able to put aside a substantial number of videos, materials and activities, which will allow their to face any content. Moreover, Registering lessons is simple because there are totally free applications and software that are easy and intuitive to use.

The didactic supplies that can be used are: LIM, Personal Computer, Tablet, Smartphone, development of interactive pages, laboratory activities, ITC (Information and Communication Technology), magazine articles and online newspapers.

The objectives are: aimed at giving students an awareness of their relational, critical and analytical skills; develop the ability to select the sources of the topic, with the choice of the most significant according to the modalities established in the prerequisites of the research; the critical discussion on the choices made by the other students and the selection of the most relevant topics. To encourage aggregation and group work (cooperative learning), the tutor forms heterogeneous groups, which will develop the assigned topic, with different types of outputs.

The lesson takes place through an ordered sequence of activities that the tutor constantly monitors, in order to make the appropriate corrective actions, such as:

1. He gives students the topic to be developed at home, with the help of the tools and teaching aids identified.
2. He indicates the main social networks surveyed: Facebook, Instagram, YouTube.
3. He provides basic notions about the topic to be treated in general.
4. He teaches to focus on the topic and indicate which, if any, are the main regulatory references in force in Italy or in the European Community.
5. The tutor identifies, from a practical / operative point of view, four working groups, each consisting of 4/5 elements
6. He describes what is the modus operandi to be adopted.
7. He provides each group with multimedia material to be studied at home (Web sites, podcasts, video documents, search pages, etc.) and also support for groups who request it, using the information technology available (video calls, call conferences, etc.)
8. The home study activity is followed by a wide discussion in the classroom, where the tutor collects the results of the analyzes and in-depth analyzes on the topics assigned to the individual groups.
9. On this basis, the tutor during the classroom discussion, in which he stimulates the intervention and the active participation of each individual student, records the results through a grid that he uses for the final evaluation. experience frustration, and give up (Fig. 1).

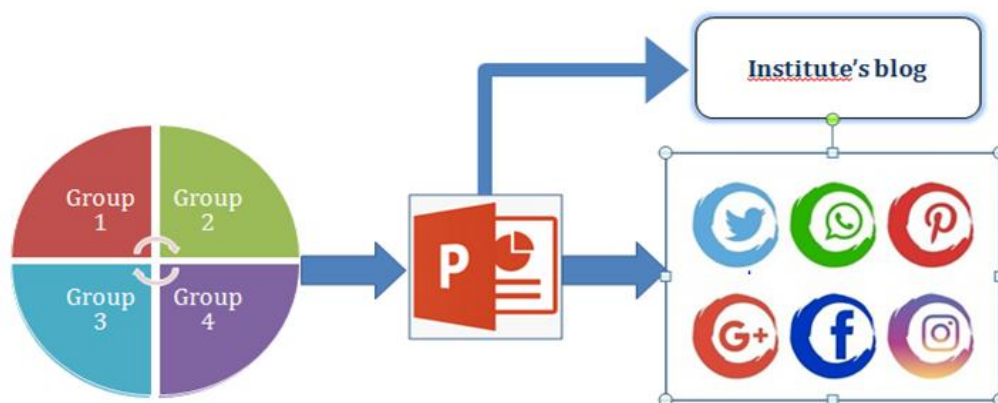


Fig 1. Task sequence of the flipping

The tutor, to verify the opportunities for the growth of awareness of all learners in relation to the topics covered, provides a final questionnaire (Table 1) that determines the result achieved by each individual student, in terms of less or greater understanding of the topics covered.

Therefore, from the verification, the tutor is able to understand if there are students who need an additional study to reach the expected levels of awareness

Table 1. The evaluation form that the tutor compiles during the discussion

STUDENT	EVALUATION		
	insufficient	sufficient	good
Attention level			
Participation in the discussion			
Understanding of the arguments			
Production of original reflections			
Critical capacity			

III. METHODS

The flipped teaching is based on the fact that the basic cognitive skills of the student (listening, memorizing) can be activated mainly at home, independently, both learning through videos and podcasts, or reading texts proposed by teacher or shared by other teachers. In the classroom, however, the high cognitive skills can be activated (understanding, applying, evaluating, creating) because the student is not alone and, together with the classmates and the teacher at his side, then tries to apply what he has learned to solve practical problems proposed by the teacher. The role of the teacher is transformed: his task becomes that of guiding the student in the active processing and development of complex tasks. Since learning the basics moves home, the time spent in the classroom with the teacher can be used for other activities based on active learning, with a view to differentiated pedagogy and project learning. The new learning cycle [8] can be schematized starting from trying to activate in students the interest, the curiosity, the desire for knowledge of a specific topic. This passage is fundamental because there is no significant learning without the cognitive and emotional involvement of the students. For the teacher it is therefore a matter of putting the development of a theme as a problem, of transposing the disciplinary contents from an expositive, demonstrative and resolute to a doubtful and hypothetical form, as much as possible anchored to reality, and leaving to the students the task of devising and proposing a solution.

This phase can take place in different ways and engage pupils outside the school and before class, but it is also possible to do it in class. We then move on to the phase in which the students are called to put into practice, albeit with forms and modalities appropriate to their abilities and context, the cognitive strategies and the investigation procedures proper to the subject matter of the learning activity. It is a question of soliciting in students the thought processes that underlie the construction of knowledge, exercising their critical spirit, learning to ask appropriate questions, to formulate reliable hypotheses, to devise methods to verify their assumptions. This can be implemented by setting up an educational setting that favors the search for information, deep reflection, peer comparison, field experimentation. Generally this phase involves the production of materials and documents by the students, individually or in groups, which will then be useful in the third phase. In this phase, the teacher assumes the role of the tutor, of the *mémoire*, who assists each student according to his specific needs, highlighting important skills of every good teacher who become fundamental in this moment that is the most interesting phase of the method: an authentic task (also called "reality") or a creative task set up by the teacher in such a way as to allow the division of work into a team logic (Fig. 2).

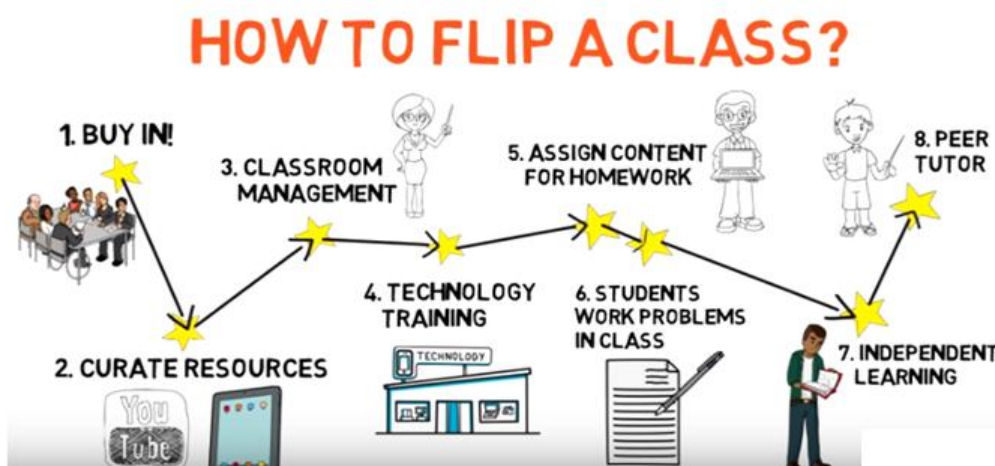


Fig 2. The Flipped Classroom Model

The cycle is completed with a phase of re-elaboration and evaluation. It is a collective process of reflection and comparison on what has been learned by the teacher through the involvement of the whole class. The aim is to clarify, make explicit and consolidate learning starting from the analysis of the works that the students have achieved in the second phase. Here the teacher performs the function of stimulating and moderating the comparison, facilitating the processes of abstraction and formalizing what has been learned. It is at this stage that more evaluation activities take shape (Table 2). In reality, they permeate all phases as a continuous training praxis through observation and annotation of the students' activity in context; the evaluation, individual and group, concerns their products, with practices of co-self-evaluation by the students

Table 2. Final evaluation on transversal skills

Classroom department.....	EVALUATION		
	insufficient	insufficient	insufficient
TRANSVERSAL SKILLS			
What are the main Social Networks			
What are the "search engines"?			
Can you give a definition of a source of information?			
Do you know what the European Community is?			
Do you know the fundamental rights contained in the Constitution?			

With "Transversal skills" we indicate a vast set of skills of the person, involved in numerous types of work tasks, from the most basic to the most complex, and performed in different operational situations. In other words, it refers to general, broad-spectrum skills related to the processes of thought and cognition, to the modalities of behavior in social and work contexts, to the modalities and ability to reflect and to use learning strategies and self-correction of the conduct. These skills connote the way of setting up and regulating personal work experience and are further and progressively specified in the course of on-the-job learning and personal working history. The verification of the transversal skills should be followed by that relative to "Specific Skills" that constitute the set of technical and operational skills and knowledge that refer to individual work processes or areas of activity carried out and the topics covered. Instead, they identify the standards and units of competence in the integrated paths between education and vocational training.

IV. RESULTS

At the end of the final evaluation and the eventual didactic support to the students who have received an unsatisfactory evaluation, together with all the working groups, the tutor traces the analytical results of the topics dealt with, highlighting problems and related solutions proposed in order to enrich the skills of each individual student.

After analyzing the results, the tutor and the students are able to gather all the elements detailed and discussed, and present the work done using multimedia support to make public their work. This is possible through the opening of a channel of rendering, that is through the publication on the net of the results of the analysis and research carried out (a YouTube channel, a page on Facebook).

The dissemination is an important moment, because it allows sharing the project with all those who are part of the same reality, which, although not directly involved in the activities, could be in the condition of having to continue the work done, or simply benefit from it.

On the basis of this system, at the request of school managers, training and intervention activities were carried out in some primary and secondary schools of first and second degree (Paciolo-D'Annunzio high school in Fidenza (PR), the Bassa Valle school network Camonica Inclusiva (BG), of the Class 2.0 of the BossoMonti Institute of Higher Education (TO), of the 2.0 School of Albignasego (PD) and of the Rocco Chinnici State Professional Institute of Nicolosi (CT). The intervention plan adopted consists of the following points: voluntary involvement of teachers interested in experimenting this path in their teaching practice; training of teachers in blended mode, adopting, when present, the learning management system used by the school (usually Moodle or Edmodo; on research and reuse of Open Education Resources; on the production of videolections (technical, communicative and didactic aspects); on the creation of communities of active in-class and online; planning by the teachers of Learning Units based on the proposed approach; application in the respective classes of the designed Learning Units; analysis of the interventions conducted.

The research on the interventions carried out is carried out with a qualitative survey with the teachers and the students through questionnaires, interviews and focus groups. Where this has already been completed, the outcomes have been encouraging, especially for motivational aspects in students and teachers [9]. In a school in which an ongoing intervention has been planned involving all the teachers of a class and which is based on the entire study cycle of a five-year cohort of students, a plan is being activated of research that also makes use of quantitative analysis methodologies aimed at investigating modifications (pre-post) in three distinct areas:

- development of skills. Analysis that is carried out with the administration of tests derived from those prepared by the OECD - PISA investigations;
- motivation to study / school engagement. Analysis conducted through the administration of the AMOS tests [10] on study strategies, study approach and beliefs;
- aptitude and approach to study in relation to specific disciplines using tests such as Attitudes Toward Mathematics Inventory [11].

Given the spread that the Flipped Classroom is taking, we believe it is opportune to urge educational research to develop tools for qualitative and quantitative analysis specifically dedicated to its teaching practices and to the original learning / teaching contexts in which students and teachers find themselves. The numerous

and increasing applications of the approach in many countries require adequate analyzes and can constitute a solid basis for the validation of appropriate investigative tools [12].

V. CONCLUSIONS

At European level, particular attention has been paid to the study of innovative teaching methodology, undergoing experimentation in Northern European countries: the lesson are based on "topics", which ban classical frontal lesson in classroom, to favor work in small groups that help develop problem solving skills. For about two years the Nordic countries have been experimenting with horizontal rather than vertical studies: traditional subjects disappear and macro-themes are favored. This type of teaching intends to remove the idea of school as a "examificio", that is a path aimed exclusively at passing the final exams without paying attention to the skills that the student actually builds during the years of study. A teaching conducted by topics develops character, personality and skills such as resilience and the ability to communicate.

With great success, these schools direct young people from different disciplines such as Engineering, Medicine, Business, Humanities and Education to work together to solve big problems with a focus on human value. The open and radical culture of collaboration practiced in these schools inspires both intellectually and emotionally, and creates an environment where people from different areas such as big companies, startups, non-profit organizations and governments can participate by working and learning together on projects. Human values are at the heart of the collaborative approach used.

This general view on "active methodologies" has the objective of starting to undermine a proven, but perhaps outdated model, such as the frontal lesson. Overcoming this approach is not easy, it means for teachers to leave a reassuring and hospitable place, to embark on a complex path in the direction of pupils, who today inhabit cultural spaces completely different from those of adults and the generations that preceded them. The challenge is epochal, and it will not be the technologies themselves that will solve it, at the most they will be able to direct and support it, but only if they remain a means and not an end to teaching.

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