

ICT AND INNOVATIVE TEACHING. HOW TO BUILD SKILLS FOR GENERATING WEB 2.0 WITH FLIPPED LEARNING. A CASE STUDY ITIS MAJORANA OF BRINDISI

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Abstract: *The Italian National Guidelines for the first cycle and for high schools, as well as guidelines for technical and professional institutes, articulated learning outcomes for skills. The definition of reference of skills is that given in the Recommendation of the European Parliament and Council dated 23 April 2008 of the establishment of the European Qualifications Framework for lifelong learning (2008 / C 111/01). The adoption of the European Qualifications Framework (EQF), applied in levels defined on the basis of skills, knowledge and ability, will make it possible to compare titles and professional qualifications of the students of the various countries. However, attempting to verify the status of this state of the art new learning paradigm it is clear that the teaching skills are spreading very slowly in Italy. To achieve the curriculum, the set of skills that all children need to acquire and the UDA, the learning units that enable them acquisition requires a substantial investment of time and the collaboration of several teachers. This type of education stipulates a new way of thinking and flipped learning has proved to be a valuable support. Teaching for skills is based on the idea that it is important (Da Re, 2009) that children learn not only the facts, ideas, concepts, but above all that they learn how to apply them in practice, and how to use them in non-conventional fields precisely transforming their skills knowledge. With the methodology of the flipped classroom all six degrees of learning are within the reach of ordinary learning. In the ancient profession of teaching it is good to find new means with MOOCs (Massive Open Online Courses) with flipped classes. The flipped classroom therefore consists of inverting the location where the lesson is held with the one in which they study and do their homework. This approach combined with multimedia learning resources in general can become functional to a constructive and social education. This favored interactive online personalized teaching experience is moving closer to the needs of digital natives. As H. Jenkins (2010), former director of the Comparative Media Studies Program at MIT (Massachusetts Institute of Technology) explains, the traditional analogical model of learning is ill-adapted to our completely hi-tech generation. The flipped classroom tip also overturns student assessment outlining a model of authentic evaluation takes into account individual differences among students which does not stem from poor personal commitment. Flipped learning allows students to achieve these objectives. This paper explores this leading theme through an empirical experimental-approach case study of ITS Majorana Brindisi.*

Keywords: *ICT, innovative teaching, skills, flipped classroom*

1. INTRODUCTION

The Italian National Guidelines for the first cycle and for high schools, as well as guidelines for technical and professional institutes, articulated learning outcomes for skills. The definition of reference of skills is that given in the Recommendation of the European Parliament and Council dated 23 April 2008 of the establishment of the European Qualifications Framework for lifelong learning (2008 / C 111/01).

The emphasis of learning outcomes in terms of skills in the different educational levels accepts the invited concepts in the Recommendations of the European Parliament and Council dated 23 April

2008 to allow for comparison of European titles and qualifications required for the job mobility within the various Member States of the European Union. The adoption of the European Qualifications Framework (EQF), applied in levels defined on the basis of skills, knowledge and ability, will make it possible to compare titles and professional qualifications of the students of the various countries. However, attempting to verify the status of this state of the art new learning paradigm it is clear that the teaching skills are spreading very slowly in Italy. To achieve the curriculum, the set of skills that all children need to acquire and the UDA (Castoldi, 2009), the learning units that enable them acquisition requires a

substantial investment of time and the collaboration of several teachers. This type of education stipulates a new way of thinking and flipped learning has proved to be a valuable support. Teaching for skills is based on the idea that it is important (Da Re, 2009) that children learn not only the facts, ideas, concepts, but above all that they learn how to apply them in practice, and how to use them in non-conventional fields precisely transforming their skills knowledge. In teaching skills the precisely principle is to integrate: knowledge, know-how, knowing how to do, knowing why, the generalization and transfer of knowledge, concept, planning, address and manage; the collaboration and interaction. The ultimate objective is to train an appropriately qualified person who is capable of taking action. In the 50s of the twentieth century a US scholar Benjamin Bloom outlined degree scale of learning which remains traditional: 1) to know, remember; 2) understand, describe; 3) apply; 4) analyze; 5) evaluate; 6) create. With the methodology of the flipped classroom all six degrees of learning are within the reach of ordinary learning. In the ancient profession of teaching it is good to find new means with MOOCs (Massive Open Online Courses) with flipped classes. The flipped classroom therefore consists of inverting the location where the lesson is held with the one in which they study and do their homework. For several years the students of Woodland Park High School in Colorado and many other schools in the world follow lessons at home using videos made by their professors or taken from the internet. Then they study and practice in the classroom, in small groups, assisted by teachers so that they can tailor their actions taking into account the pace and potential of each one. This approach combined with multimedia learning resources in general can become functional to a constructive and social education. This favored interactive online personalized teaching experience is moving closer to the needs of digital natives. As H. Jenkins (2010), former director of the Comparative Media Studies Program at MIT (Massachusetts Institute of Technology) explains, the traditional analogical model of learning is ill-adapted to our completely hi-tech generations. From their first year of life, children are used to a participatory culture. The flipped classroom tip also overturns student assessment outlining a model of authentic evaluation takes into account individual differences among students which does not stem from poor personal commitment. Flipped learning

allows students to achieve these objectives. This paper explores this leading theme through an empirical experimental-approach case study (Trincherò, 2004) of ITS Majorana Brindisi.

2. LANGUAGE FOR SKILLS: A CHALLENGE ACCEPTED

The most significant news in the debate about schooling in the last ten to fifteen years consists of the eruption of the development of expertise. This is not simply a term alongside those traditionally used in scholastic language to identify the goals of learning: knowledge, skills, attitudes, aptitudes, skills, or the like (Topping, 1997). The development of expertise brings with it a paradigm shift in conceptualizing the learning experience and a reflection of the training model of the school. Only full awareness of the subversive potential contained in the development of expertise can help to address the operational implications associated with its use in teaching and school assessment. It is not on the surface structure of teaching practices and evaluation of the school that the resulting development of expertise should be explored, but rather the deep structure, on ways of thinking about teaching and learning. To quote Watzlawick (1974) this is a "change of type 2" amending the paradigms and assumptions of the values of the educational experience, not of a simpler "change of type 1" limited to some corrective or revisions of the facade. The first definition of development of expertise was used in the field of education. The first meaning of the concept of expertise used in training recalled a behaviorist perspective, according to which jurisdiction is identified with a performance of the observable and measurable subject. Based on a design paradigm and evaluation based on technical rationality it aspired to break down the skills into a set of empirically observable performances, whose summation allowed to verify the level of proficiency of the subject (the matrix "job / skill" well represents this type of approach to competence). In subsequent decades there has been a progressive articulation of the concept, which can be summarized in three evolutionary directions: *from simple to complex*: expertise cannot be reduced to a set of atomic and separate performances, but tends to be thought of as an integration of resources held by an individual, which involves the activation of knowledge, skills and personal dispositions relating to both the cognitive level and the socio-emotional and willful level. Its expression requires

mobilizing and putting into play the whole of the person in their many dimensions, it cannot be reduced to isolated performances and defined; *from external to internal*: the analysis of the expertise requires going beyond observable behaviors and paying attention to the internal provisions of the subject and the way in which they approach the performance of an operating task. In this direction lies the distinction of Chomskian origin between "competence", defined as inner quality of the subject, and "performance", defined as observable behavior; distinctive recovery and extended to cognitive processes by B.G. Bara:

The term competence means the set of abstract skills possessed by a system, regardless of how those capabilities are actually used. The performance term I am referring to the capabilities actually demonstrated by a system in action, may be directly deduced from his behavior in a specific situation. (Bara, 1990).

From abstract to found: expertise cannot be reduced to an abstract and general concept but tends to refer to the ability to deal with specific tasks in different cultural, social, operational contexts. The reference to specific tasks highlights the growing size of contextualized competence, attributable to the use of exact knowledge in practical situations and in relation to specific purposes. In a figurative and effective manner, Le Boterf (Le Boterf, 1990) summarizes the path of development that has characterized the concept of competence in the transition from the "know how" to "knowing how to act": an expression that aptly summarizes the transition from a vision behaviorist, more centered on the operational and performance dimensions, with a view that echoes the strands of social and situational constructivism (see Le Boterf, 1990).

A concise definition of the concept, able to account for the evolutionary path that we have drawn, is that proposed by M. Pellerey, who defines competence as

the ability to cope with a task, or a set of tasks, failing to put in motion and to orchestrate its internal resources, cognitive, emotional and willful, and use external ones available consistently and productive (Pellerey, 2004).

This enables us to highlight the main attributes that are categorizing this concept in current learning debates: the ability to cope with a task or set of tasks as the focus of the manifestation of competent behavior, which implies the *use* of

knowledge to deal with problematic situations and highlights the operational dimension underlying the concept of expertise, its inseparable link with the action; *to set in motion and the orchestration of its internal resources*, which signals the holistic nature of expertise, not be reduced to mere cognitive, but also extended to motivational, attributional, socio-emotional and metacognitive components. The demonstration of a competent (Castoldi, 2013) behavior requires the subject to put everything into play himself, mobilizing all the personal resources available; *the use of external resources* according to the task at hand and their integration with internal resources, meaning external resources are the other parties involved, both the tools and the means available, and the potential present in the physical and cultural environment where the action takes place. This highlights the values found in expertise and the ecological perspective within which to understand the meaning and the value.

According to this interpretation, the development of expertise is understanding the various dimensions involved in the learning process, related to the following three levels: knowledge, intended as representations of the world that the subject is constructed through the stimuli that come from the external environment and from the encoded knowledge (classified into declarative, procedural and conditional); skills, defined as operating frameworks that allow the subject to act on the physical and mental appearance of material or symbolic objects; the disposition to act, designed as the aptitude of the subject to relate to the reality in which it operates, both on the subjective aspect (relationship with himself and with others), and on the objective aspect (relationship with the context of action and with the task reality).

Albeit with differences in terms and concepts, the concept of shared responsibility that we have drawn from the most recent literature on this topic in education: it offers one of the most influential and emblematic, taken from a project promoted by the OECD-oriented identification of key competencies for active involvement in adult life, in which there are three levels indicated (knowledge, know-how and interpersonal skills) and are well highlighted keywords that define the development of expertise: "realization" to highlight the reference to a task to be solved through a recognizable and identifiable product; "Integration" to invoke the mobilization of resources available to the subject; "Context" to

emphasize the capacity to move within the resources and constraints characterizing the context of action; "Responsibility" to invoke the active role of the subject in the exercise of competence (Perrenoud, 2003). Another authoritative reference is included in the Recommendation of the European Parliament and of the Council on the European Framework of Qualifications for lifelong learning (23 April 2008), in which the following definitions are proposed:

knowledge "means the outcome of assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices related to a field of study or work. In the European Framework of Qualifications, knowledge is described as theoretical and / or practical"; skills "means the ability to apply knowledge and use know-how to complete tasks and solve problems. In the European Framework of Qualifications, skills are described as cognitive (use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools)"; competence "means the proven ability to use knowledge, skills and personal, social and / or methodological abilities, in work or study situations and in professional and / or personal development. In the European Framework of Qualifications "competences "they are described in terms of responsibility and autonomy.

3. ICT AND INNOVATIVE TEACHING FOR STUDENTS WEB 2.0. METHODOLOGIES AND RESEARCH TOOLS: THE FLIPPED CLASSROOM

This type of education stipulates a new way of thinking and flipped learning has proved be a valuable support. Teaching for competence is based on the idea that it is important (Da Re, 2009) that children learn not only the facts, ideas, concepts, but also that they learn how to apply them in practice, and how to use them in non-conventional environments by precisely transforming their knowledge skills. In teaching skills for expertise (Brandsford, 2000) the precise principle is to integrate: knowledge, know-how, knowing how to do, knowing why, the generalization and transfer of knowledge, create, design, address and manage; to collaborate (Crouch) and interact. The ultimate goal is to train a competent person who is aware of the operated knowledge. In the 50s of the 20th century US scholar Benjamin Bloom outlined a scale of degrees of learning which remain classic:

1. to know, remember;

2. understand, describe;
3. apply;
4. analyze;
5. evaluate;
6. create.

With the methodology of the flipped classroom (Keengwe J., 2014) all six degrees of learning are within the reach of ordinary learning. Within the ancient profession of teaching it is good to learn new tools with MOOCs (Massive Open Online Courses) with flipped classes. The flipped classroom therefore consists of inverting the location where the lesson is held with the one in which they study and do their homework. For several years students of Woodland Park High School in Colorado and many other schools in the world have followed lessons at home using videos made by their professors or taken from the Internet. Then study and practice in the classroom, in small groups, assisted by teachers who can then tailor their actions taking into account the pace and potential of each one. This approach combined with multimedia learning resources in general can become functional to a constructive and social education. This online interaction promotes personalized learning experiences closer to the needs of digital natives. As explained by H. Jenkins (2010), former director of the Comparative Media Studies Program at MIT (Massachusetts Institute of Technology) The traditional analogical model of learning is ill-adapted to our completely hi-tech generations. From their first year of life, children are used to a participatory culture. The flipped classroom also overturns student assessment outlining a model of authentic evaluation which takes into account individual differences among students which does not stem from poor personal commitment. Flipped learning allows students to achieve these objectives. In the major universities in the United States, always at the forefront in terms of technology have been delivering real on-line courses for a number of years (Adoni, 2001). The real change, however, has not been to university where students have always been able to choose whether to attend or study at home, but in secondary schools. The idea of flipped teaching, as simple as it is revolutionary, is to make sure that students can study the video before class. It may seem trivial, but this small change will free an incredible amount of time in the classroom. This timeframe can be used to answer their questions, to organize group work (Kaye, 1994), and for many other activities in which the child gets to assume the lead role of his

training. The flipped classroom therefore consists of reversing the place where the lesson is followed (at home rather than at school) with one in which they study and do their homework (in school rather than in the home). With the methodology of flipped teaching, the teacher provides students with educational materials specifically selected, prepared by himself or by others. The educational material can be video, multimedia resources, books or e-books. Students study watching videos and consulting the material time and time again, each according to their needs, before and outside of school, and not after, as in the classical model. The on-line interactivity, also promotes personalized learning experiences, closer to the needs of the latest generation, those of digital natives (Fornasari, 2013). The second part of the work happens in the classroom, where the teacher proposes and follows the enforcement activities alongside the pupils rather than from behind the desk; tutorials, workshops, assignments, problem solving, case studies, in-depth activities. We can then define a flipped classroom (Houston, 2012) as a class that: increases and enhances the time when students and teachers are in contact; an immersive environment in which students take responsibility for their own learning, a class where the teacher is not the wise man in the chair, but the guidance alongside the child; a mixture of direct instruction and constructivist learning; a class in which absent students are not left behind; a class in which the contents of the learning are permanently archived for possible revision, to be retrieved and for subsequent years; a place where all students can enjoy personalized learning and express their characteristics and potential; a place where more talented children can be encouraged to help those less talented. In order to become a flipped teacher one should have: a computer or tablet with Internet access and software Office Automation with Word, Excel and Power Point for feedback of contents; a recent quick and easy browser (like Google Chrome) which enables you to translate foreign websites into your language; a mailbox. The first step is to publish our educational material on a website so that it is available to students. In particular: the teaching materials we use, the exercises addressed and examples, instructions and tasks to do at home (Keengwe, 2013). There are essentially three ways to go on-line: use the platform of e-learning provided by the school (many schools are using Moodle for this purpose), (Galliani, 2004) use a free e-learning platform such as Edmodo, a social network constructed for

schools and designed for educational purposes; publish your own content on your own website, which has been specially developed.

4. A CASE STUDY ITIS MAJORANA OF BRINDISI. RESULTS

A skills oriented education (Michelini, 2013), in which the teacher is a 'facilitator' of learning and also virtual classrooms, e-learning platforms with synchronous and asynchronous classes, brief teaching. This as experimented by the Technical Sector- Technological High School of Applied Sciences Majorana in Brindisi which I report in my case study. Banned from the normalizing action of reform, the experimental teaching decision finally reappeared on the agenda of the school. And so the experimentation carried out by the Institute Majorana in which the duration of schooling has been taken from 5 to only four years: a revolution to optimize the methods and timing of teaching through innovative methodologies producing graduates who are not only a year younger but also more 'competent' to continue their studies and for the job market. This is a reorganization of school time that is intended to bring the Italian curriculum in line with the European, simultaneously allowing Italian students to achieve their diploma a year earlier than they normally do in Italy and in line with what happens in many EU countries. The presence of a committee composed of representatives of the Ministry and the schools participating in the trial that will aim to finalize the details and to monitor the path, which is a trial followed by the Ministry based on the principle that we should not squeeze five years into four, but make better use of school time organizing a less rigid delivery of timetabling. The learning objectives are the same path as for five years, in fact, a different State Examination is not expected, but academic credits starting from the second year instead of the third. Training offers have been increased also strengthening ties with companies and therefore the alternation of school-work, which continues to envisage, a phase in school with lessons created by positions that come from the world of production and work experience. A 2.0 school, "Majorana" which carries a wealth of experience in all respect when it comes to innovative teaching practices and new technologies (from robotics to the Book in progress project with the flipped classroom. Regarding the project Book in Progress this textbook, of high-scientific and communicative importance, was written by 800

teachers from the national network led by ITIS Majorana Brindisi and printed in schools. This initiative has significantly improved student learning and, at the same time provides a practical answer to the economic problems of families and expensive books. The publishing schedule of the Book in Progress includes the delivery of textbooks for the following subjects: Italian, History, Geography, Chemistry, Economics, English, Integrated Science, Physics, Law and Economics, Mathematics, Computer Science, Design and Technology, Natural Sciences for the first and second classes of secondary schools, Technical Institutes and Professional Institutes. The structure of the Book in Progress, can be varied according to the basis of educational needs, training and learning of the students, the contents to be passed on). Almost the majority of non-language subjects, then, shall be in a foreign language (CLIL), and there has been a great deal of investment in placements abroad and above all to reorganize school time. It is aimed at a different methodology that has made new technology their best resource. E-learning platforms were built with synchronous and asynchronous states. Firstly students ask the teacher questions and considerations, secondly they will benefit in the home through recorded materials available to them at any time. It is aimed, in short, to create real communities of learning. Some places become virtual, others continue to have their physicality, but changes the way you enter and sit in class around circular tables. Farewell then dear old chair: Even in just a few years the students of Majorana Brindisi work in similar skills groups guided by the teachers who are facilitators and not dispensers of knowledge. The idea is to enhance the experience of the six flipped classrooms activated by the Institute, in which traditional teaching virtually no longer exists: the exercises are not assigned by the teacher after the explanation, but immediately given to pupils through multimedia video that can be seen and revised according to need. Even the procedure for parallel classes is performing well: in this way the teachers can exchange students and focus on strengthening or recovery of certain topics based on the real needs of students. But what is the answer from the region in the face of a proposal for a school so different from the traditional one? Fear or interest? Through the administration of a closed answer questionnaire administered on-line to families of students of the first year (and tabulated with SPSS software) 83% of families were

recorded as being excited about the ongoing trial their children showing an increase in the amount of motivation for study and better performance.

5. CONCLUSIONS

When class grading, teachers' meetings, departments, the electronic register to be completed, questions and correction tasks absorb almost all the time and energies of a teacher, you realize that you are likely to precisely forget about the children. Students certainly come to school to learn but also because they need guidance. Often they are ready to follow the teacher and engage in subjects which they do not like, provided they 'receive in return a little' of that attention that can give meaning to their efforts. Also the children no longer need to learn by heart but require a reference point to navigate the endless details that are now within their reach at any time, swiping a button with their finger on their Smartphone. Who better than the teacher, who follows them for years, who has the opportunity 'to lead them towards the path of knowledge?

The model of the flipped classroom, as we have seen in this article, provides a framework and the tools to provide classroom lessons at home thus gaining valuable time in the classroom. And so more 'time can be spent making sure that knowledge will transform into skills and to support their growth, helping them to overcome the problems'. Group work, peer learning, the SWoRD learning (peer review), laboratory teaching and in general all activities 'that can be organized in class to allow students to discuss between themselves, to value their individuality', and to experiment with different roles within the group. Flipped learning however, is not just the beginning of a revolution. Bermann and Sams (2012) also introduce us to the master class. Basically once the teacher has already operated the learning pinball for some years and has all the material for their courses they can' allow the more talented children to proceed independently. They can thus 'traveling at top speed' deepening aspects of the discipline that were blocked due to a lack of time. In general in fact the more motivated do not have a great need for help, but a stimulating environment that they value and which makes them grow by supporting their passions. In this context, our hope is 'that the school can become not the place where young people learn the basics but rather the framework of experimentation, the sharing of knowledge, creativity and passion (Trincherò, 2012).

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