UNIVERSITY AND FLIPPED LEARNING TIC&DIL PROJECT: FRAMEWORK AND DESIGN

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ABSTRACT

The flipped classroom approach (FC) is for the educational world a chance of recovery and improvement of pedagogical student -centered model and collaborative teaching methods aimed at optimizing the time resource and to promote personalization and self-learning in a perspective of autonomy.
The paper moving from a pedagogical reflection on innovative methodology for the improvement of teaching in schools and universities, presents the model of Flipped Classroom activated during 2014-2015 at the University of Salento in the experimentation of the E -Learning in the University by focusing on the pedagogical model implemented: theoretical framework, research objectives, development phases and testing

KEYWORDS

Flipped Classroom, technologies, university, pedagogical student -centered model

1. TEACHING SKILLS AND FLIPPED CLASSROOM APPROACH

Today schools and universities face challenges and demands more and more articulated that reflect the complexity of the systemic and social model which try to respond, according to the paradigm of constructivism, to new instances from the world of production and the multiple needs of new generations of students.

In the conclusions of the work of Lisbon the European Parliament, in 2000, indicated some ways to renew teaching, considering that transmissive teaching often generate in students demotivation, alienation and disaffection for study (Da Re, 2013). In the Recommendations of 18 December 2006, are set out in a definitive way the eight key competences for European citizenship by defining the concept of competence as "a combination of knowledge, skills and attitudes appropriate to the context [...] those which all individuals need for personal fulfilment and personal development, active citizenship, social inclusion and employment". Teachers are asked to promote students learning through experience and through induction processes, whether by encouragement for knowledge representation.

According to many studies Italian university students have to be structurally considered as digital natives (Cavalli et al., 2009). Considering that, in order to effectively offer students opportunities useful to build the expertise it is necessary to provide tools, techniques and strategies centred on competence.

Alongside the lessons it is necessary to provide discussions, group work, case studies, solutions of problems of experience, taking of decisions, realization of meaningful tasks, because the learning motivation is the result of two conditions: perceive to be able to tackle the task and feel that the effort required has a value and meaning (Brophy, 2003).

This structure often not combined with a limited time in the classroom or the limit of credits assigned to the discipline, but digital technology can be a valuable ally.

We know a lot about the phenomenology of technological innovation, that are generated at each wave peak expectations, accompanied by recurrent mythologies, were followed by failures and advent of new waves (Oppenheimer, 2003; Ranieri, 2011).

Asked if there is a positive relationship between technology and learning the answer is negative: often we find that the use of new technologies in school is not in itself effective; consequently are the methods and not the technology itself that make a difference in learning outcomes (Clark et al., 2006; Hattie, 2009), however, among the technologies the main benefit is presented in the use of interactive video (Calvani, 2012).

Looking at the contribution of teaching methods, the cooperative approach and the laboratory didactics are those that the scientific literature and best practices attest as functional and productive. It is educational settings designed to make students think and act on deliveries active.

Recent education research is focused on how teachers can improve their didactics and use the class-time more efficiently than the traditional lesson. A way to create a didactic more interesting through the use of technology is the flipped classroom or flipped learning.

The flipped classroom structure gives students the opportunity to practice in-class what they are learning, which is consistent with the constructive alignment approach recommended by Biggs and Tang (2007).

The flipped classroom structure demands active engagement both from the students and teachers. Sam and Bergmann suggest that teachers "flip" their class to utilize the time most effectively. They propose that that students, prior to attending class should read a chapter, watch a video or explore a new topic. Then, the teacher may facilitate a discussion based on this information to deepen the students' understanding. Looking at the contribution of the cooperative approach teaching methods and teaching laboratory are those that literature and best practices attest as functional and productive.

An educational structure able to recover time and experiential workshop classroom to dedicate it to the activation of cooperative tasks, peer learning, workshops and educational problems, is given by Flipped classroom (class upside down).

The FC approach refers to an inverted teaching, ie a model which locates in face to face teaching not the transmission of knowledge, but rather the deepening and sedimentation of learning through exercises and critical reflections downline of an individual study, but structured that the student performs independently choosing time and space for learning according, however, to time ranges and specific deliveries proposed by teachers. The study, therefore, is not a proxy by the teachers, but a chance for students to personalize and self-regulate his learning process (Franchini, 2014), while teaching, traditionally represented by the combination of explanation-homeworks, becomes a process in several stages aimed on the one hand to accompany the learning through the promotion and realization of learning materials prepared ad hoc (video-classes, network resources, books etc), the other hand a moment to dispel concerns through dialectical discussions and to support the learning through exercises and groupal or individual in-depth analysis (think of the teaching laboratory and cooperative learning) by promoting to students thinking (Khan, 2012) and self-management (Fulton, 2012) skills increasingly complex.

Therefore the entire educational process to undergo a real inversion in response - these are the premises from which the promoters are started - to the needs of the teachers to optimize and not waste time in the classroom. The teachers, indeed, are increasingly gripped by school programs endless that steal their time limiting the moments of study and exercise to isolated and episodic experiences.

The FC approach is not a pedagogical model, it doesn't have an epistemology well-defined: it is the result of a multitude of experiments and best practices empirically poorly controlled and comparable to each other, created to satisfy the needs that come from the world of education and aimed recovery pedagogical model learner-centered aimed to customization and sharing of learning (Bloom, Vygotsky or teaching methods as Peer-Assisted, Tutoring, Collaborative and cooperative learning) according to a perspective of optimization of the school time and empowerment the autonomy of the student.

This autonomy is not only about the approach to the study, but it affects the democratization of knowledge and, therefore, the sphere of student participation in the co-construction and sharing of knowledge

Franqueira and Tunnicliffe (2015) performed an exploratory study on this topic following the Critical Interpretive Synthesis methodology for analysis of the literature.

According to them words like flipped learning and flipped classroom are often used interchangeably as an indication of innovation, flexibility, creativity and pedagogical evolution and they indicated that the term "Flipped Learning" is misleading and that, in fact, the synthetic concept behind it is "Flipped Teaching". They realized a synthesising argument, in the format of two synthesis models, of the potential benefits promoted by flipped teaching and the potential issues which affect its success in practice.

2. FLIPPED LEARNING IN HIGHER EDUCATION

Despite the FC appears more prevalent in the context of school, the world of higher education promotes more and more experiences of research and teaching that refer to this approach.

In fact, in recent years in academic and lifelong learning have been launched several experiments aimed at guide the student in the process of acquisition of knowledge and skills of disciplinary knowledge highly codified (mathematics, physics, chemistry, etc.) in which the risk of failure of learning and dropouts is very high.

In that sense, if in school this approach responds to a need to rationalize and optimize the limited time available, in the academic context, characterized by a high degree of freedom and management (which does not mean autonomy) of time and learning, this approach performs a specular function: return to students, through precise training deliveries, assigned by the teachers, the "weight" and the "sense" of learning time, orienting them, then, to a self and competent managing of it.

Such operation, if in one hand is intended to contain the wasting of resource time and, consequently, to empower students, on the other hand gives them the ability to customize their own learning process according to their educational needs (styles earning, special needs, etc.) and life needs (business and familiar needs).

In response to these needs, the FC approach uses structured learning contents and disseminated in asynchronous mode that become preparatory to the recovery of the content in the classroom. Most educational experiences FC refers to an educational e-learning or blended learning and uses video lessons and learning materials available and shared across the internet.

There is an extensive literature on the attitudes and perceptions of students about the use of video lessons in education (Bolliger et al., 2010; Fernandez et al., 2009; Hill & Nelson, 2011; Lonn & Teasley, 2009; Chester et al., 2011), while a scientific debate about FC approach is lacking. Bishop and Verleger (2013), indeed, have examined 24 empirical studies on this issue highlighting that a strong methodological and content heterogeneity often are not supported by empirical data.

In contrast, however, in recent years on the web it is observed a proliferation of blogs, websites and videos aimed at the promotion and sharing of FC teaching (like Flipped Learning Network).

3. TIC & DIL PROJECT: FRAMEWORK AND DESIGN

The Tic & DIL project: Information Technology and Communication and Teaching of Reading, has been developed by the working group of the Center on New Technologies for Inclusion of the Dpt. of History, Society and Human Studies within a PON for the development of E-learning in the University.

The flipped classroom approach used in this study was undertaken in Semester 2 (February-June 2015).

The project aimed to develop a learning environment/workshop for students of the undergraduate and graduate program of the Faculty of Education.

The course was organized in two interdisciplinary thematic unit (ITU) implemented according to the flipped classroom model.

Common theme of the two ITU was: LANGUAGES and READING, i.e. insights and workshops aimed to promoting in the university context interdisciplinary links about learning languages mediated by technology of dyslexic student (fig 1).

The ITU bound bachelor students has involved teaching and teachers of literary theories and methods of education and teaching methods Laboratory.

The ITU intended for students of degree involved teachings and teachers of the Laboratory of educational planning and of theory and techniques of observation of behaviour in education.

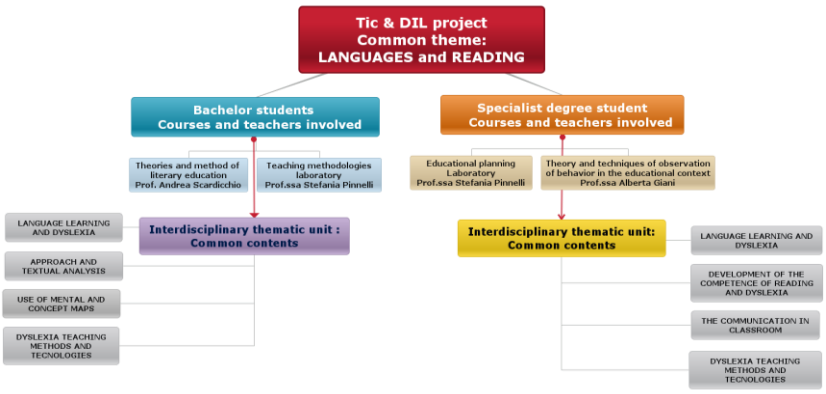

Figure 1. Interdisciplinary thematic unit (ITU)

The online learning has been divided into multimedia and thematic lectures designed with an hypertextual logic with videos and simulations in order to encourage the interaction among students.

For the construction of educational activities the students have been used proprietary and open source software (Camtasia, eXeLearning, Edpuzzle, Storyline, Xerte, Prezi) that have allowed to reuse video assets available on major web portals.

The project and teaching activities have lasted 5 months (February-June 2015) and were designed to recognize and evaluate: the learning outcomes achieved by students in both groups (see the experimental model); the effectiveness of the FC teaching model; the critical elements about technological choices adopted.

4. EXPERIMENTAL MODEL

The project was implemented through the use of the Moodle platform of the University (http://formazioneonline.unisalento.it/) (Fig. 2).

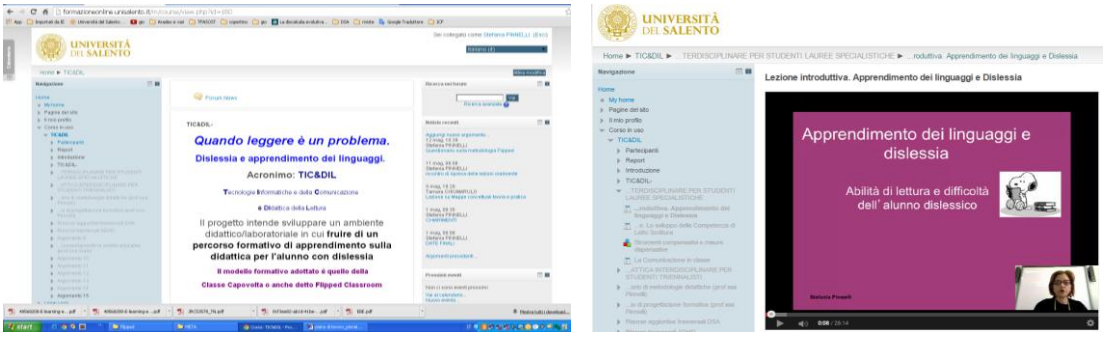

Figure 2. Entry page in Moodle and video lesson example

The investigation involved a total of 380 students. The experimental design included a control group (CG) and an experimental group (EG): the CG included those who voluntarily entered to the experimental model (260 between graduate and undergraduate students); CG (120 students) included those who had chosen to follow the traditional teaching model.

Inside the EG there was activated a second level of testing. A portion of the EG (25 students), followed a blended learning, so that for some activities, the contents that would have been the subject of subsequent lessons were anticipated with handouts or videos online.

4.1 Planning and Time

The two groups attended a similar program in terms of content from March until late April, based on a traditional teaching (lectures) and workshop activities in the classroom. The EG used the Moodle platform in order to support teaching (access to learning materials used in class, handouts and maps of synthesis) and in support of the interaction (personal messages and group activities for the survey data with questionnaires; intermediate deliveries of papers and projects).

The CG has been able to acquire the documentation materials through the online message boards of the teachers. Every student prepared a learning unit (project work) online that was subsequently discussed in the classroom. From the last week of April, the CG continued its activities for another two weeks as usual.

The EG has stopped the face to face lessons in late April and enjoyed ITU online in the first week of May; during the second week of May these activities have been taken up in the classroom with workshop experiences.

This structure has allowed us to transform the classroom into a research community in which students, guided by the teacher have been involved in a discovery learning, and themselves become content creators (Maglioni & Biscaro, 2014). In the third week of May all the students (CG and EG) were evaluated. Each ITU provided three video lessons created with the software Camtasia; two hypertext lessons made with the software Exelearning, and some concept maps created with the software Cmap tools.

4.2 Monitoring and Assessment

The project articulates its assessment on three levels: I LEVEL assessment of learning outcomes, II LEVEL assessment of the two methods (blended and flipped), III LEVEL assessment of the students perception of the FC model and evaluation of the approach of studying of digital students.

4.2.1 Level 1

During the lessons the two groups EG and CG were urged to produce deliveries, i.e. construction of some elaborate, plans, maps, etc. As regard the tools we used: SW Camtasia, eXeLearning, Cmaps tools, Mindomo, Freemind. Although both groups prepared good quality products the exchange of e-mail and communication with the guys in the presence of EG have been much higher. Furthermore it has been activated a forum (fig. 3) where students could communicate doubts and uncertainties about the path of learning but also to communicate with each other.

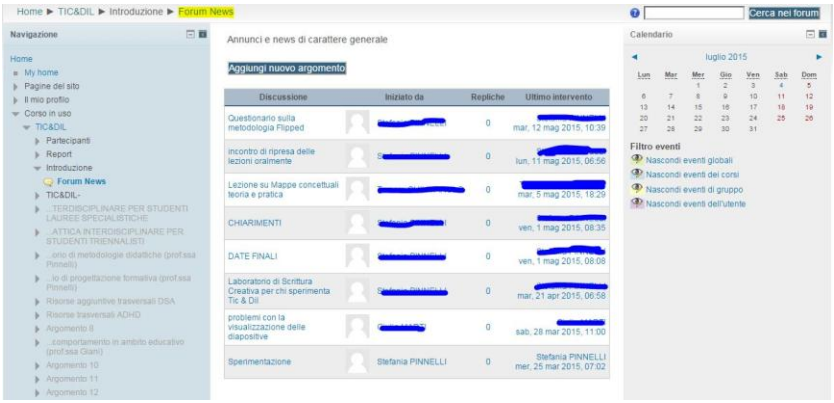

Figure 3. TIC&DIL Forum-Chat

Regardless from participation in the experimental model, students who participated in the pedagogical area workshops have taken part in a teaching workshop. The workshop setting, in fact, was the first gateway for direct passage from teaching (ITU) to design (Laboratory).

Through a selection of technological resources and instructional strategies experimented in the field, it has allowed the students to try their hand with open applications, whiteboard (LIM) and intervention models for language teaching for dyslexic students.

This environment produced several design ideas for teaching and for technologies to support people with dyslexia. The student, following a bottom-up process, has been called upon to produces ideas in a design format that launched it to a process of shared and collaborative planning.

Specifically, the students during the workshop activities have responded to the educational delivers by the teachers on the topics: after the study of the planned materials (theoretical contents and explanation of the use of technological tools), they have produced the papers: concept and cognitive maps (Fig. 4), audio books, video tutorials with the interactive multimedia whiteboard (Fig. 5) etc.

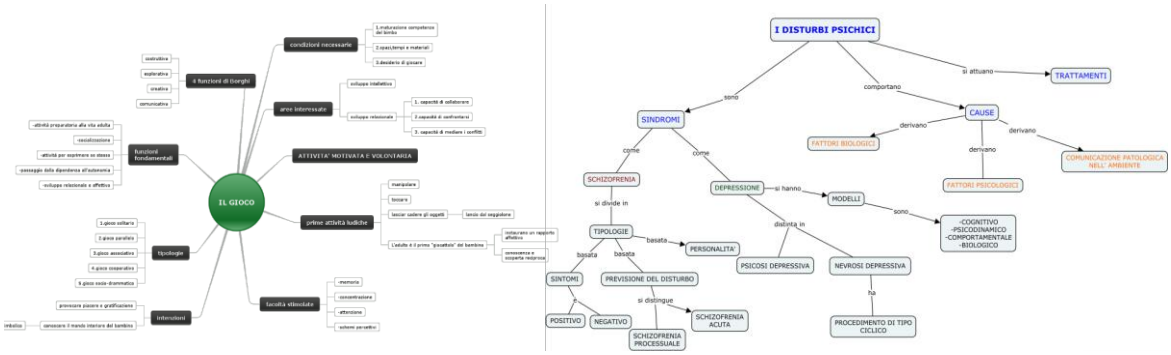

Figure 4. Conceptual map made using MINDOMO (left) and using CMAP (right)

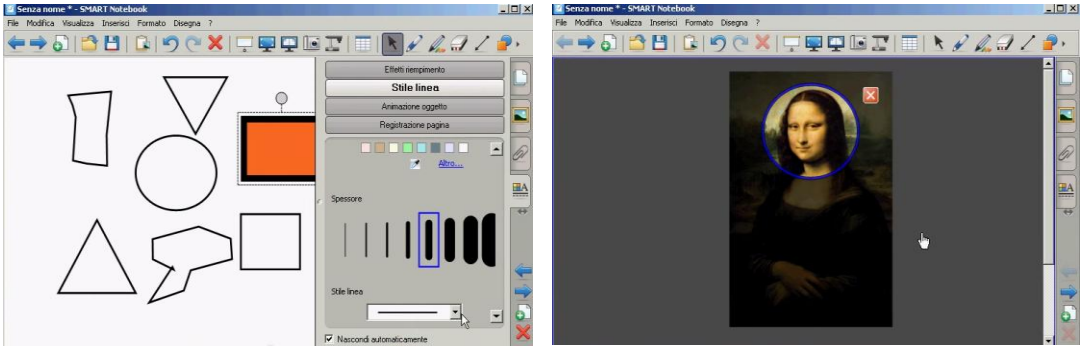

Figure 5. Example: production of video tutorial using the IMW

4.2.2 Level 2

At the end of the path the final evaluation on learning outcomes for both groups started.

The students responded to a multiple-choice questionnaire. The CG was evaluated on the program presented in class, the EG on the program disbursed until late April and on the ITU. It has compared: Learning traditional (face to face training and workshop); Blended learning (face to face training and workshop integrated with educational materials at distance); Flipped learning (distance learning mode videotaped and the next part in presence). Research shows the benefits of the FC model in university education about on the learning outcomes.

The EG had more consistent performances relate to the production and evaluation. In both groups (EG and CG), the traditional model lesson with workshops works better if supported by blended learning. While the blended learning did not affect the didactic based only on face to face lectures.

4.2.3 Level 3

Furthermore this level evaluated the experience of teaching according to the FC and Blended Learning approach. The research group has drawn up and administered an Assessment Questionnaire on the flipped experience (QFC) (Pinnelli & Fiorucci, in press), semistructured tool organized by 40 items divided into 6 areas (Tab. 1):

Table 1. Assessment Areas explored by QFC

Assessment questionnaire on the flipped learning experience (QFC) (Pinnelli & Fiorucci)	
I AREA: Socio-demographic data of the students	Items:1-7, 21
II AREA: Perception of the learning experience with FC	Items 8-15, 23
III AREA: Technology assessment	Items: 16-20, 22
IV AREA: Self-assessment of the cognitive component of the process of access to knowledge	Items: 24-28
V AREA: Self-assessment of the organizational management of access to knowledge	Items 29, 30, 33, 34
VI AREA: Self-assessment of the social and motivational component	Items 31, 32, 35, 36, 37, 38

The questionnaire also included two open items (39, 40) in which the students could express personal opinions about the strengths and weaknesses of the experience.

This level settled out the results in terms of strategies to approach the study of a sample of 129 university students.

Furthermore, this level had seen the investigation of the metacognitive skills that characterize digital students (see Pinnelli & Sorrentino, in press).

5. CONCLUSION

According to Aaron Sams and Jonathan Bergmann (2013) "in light of the principles of Universal Design for Learning (CAST, 2012) [in order to] accommodate all learners, videos, textbooks, problem sets, and other activities should became optional resources for learning rather than required activities. Students [should use] the resources that best suit them to master learning objectives".

As stated by Tucker (2012) teachers agree that viewing the recorded videos before class time is not enough to make the flipped model successful. Consequently it's very important how the teacher creates and manage the didactic and the relationship with the students globally.

The Project shows an overall very positive perception of the FC experience (see Pinnelli, Fiorucci & Sorrentino in press).

The students, in fact, see in this approach a "novelty" that can stimulate, motivate them and make them autonomous about the learning management (time, place, tools of enjoyment).

In contrast, however, it can induce a sense of loss, isolation, depersonalization and it can accentuate the relational distance among peers and with the teachers.

In addition the research shows that this approach is strongly influenced by: a careful design process and planning activities (in plenary and individual study); an accurate time management; the choice of subjects; the ways and means of teaching contents, educational deliveries and assessments etc; Cognitive-cultural elements and learning and teaching styles, learning environment; technological expertise; the recovery of the emotional and relational aspects.

The approach FC, beyond the involvement of innovative tools, must primarily considerate from the whole context of education - Teachers and students - the acceptance of a cultural learning and teaching model that in classroom practice, but especially in the minds, ought to be "flipped".

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