# Istruzione universitaria e tecnologie digitali. Una riflessione critica sul modello didattico *flipped*

# University education and digital technologies. A critical reflection on the flipped learning model

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*Over the last decade, the national and international literature in the field of teaching and learning has shown growing attention to the topic of educational innovation in schools and universities through the flipped classroom and flipped learning approaches. This paper critically addresses the potential and the limits of the flipped approach with a view to its implementation in university training courses and the development of efficient pedagogical planning. This should take into account the specific nature of the contexts, the individual differences of the students and the necessary informed use of technological means and tools in order to innovate teaching practices and avoid the risk of standardization of educational proposals.*

**KEYWORDS:** flipped classroom, flipped learning, educational innovation, educational technology, university teaching models

## Premise

Over the last decade, the exponential growth in the production and diffusion of technological tools has led to a progressive change in their use, which has ceased to be confined to private and professional spheres and has spread to teaching and training activities at all levels. The unprecedented situation that has unfolded over the past year as a result of the SARS-CoV-2 pandemic has led to an even more noticeable growth in the use of technological tools for educational purposes, particularly in the university setting. However, university lecturers have not always considered the best ways to use the technological tools they have chosen to redesign their teaching. The emergency situation has often led to a simple shift from the traditional face-to-face lesson to the digital platforms made available by university institutions without adequate pedagogical planning[1].

According to the recommendations of the experts, this unprecedented teaching scenario will be with us for a long time to come. Therefore, it is essential that we try to respond to the requests for training from the various levels of education by putting in place tried and tested teaching methods that make effective use of technological tools. In this respect, the


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emergency situation can be seen as an opportunity for critical analysis on the subject of university instruction. This year has had an enormous impact on our lives and this is bound to result in rethinking the limits of everything that was done before this devastating event. In order to attempt to respond to these training needs, we believe it is appropriate to draw on teaching methods that made extensive use of technological tools even before the pandemic and are therefore also scientifically reliable. For this reason, we consider it useful to identify some of the strengths and weaknesses of one of the pedagogical models that makes use of technological tools and that has been developed mainly over the last decade: the so-called flipped classroom and flipped learning. Needless to say, the purpose of this analysis of the model is not merely to propose its implementation, but to start a reflection on how it can best be adapted to the new university teaching context.

## 1. The teaching model of the flipped classroom and flipped learning

The flipped classroom model aims to subvert the logic and operation of the traditional delivery of instruction comprising the combination of face-to-face lessons delivered by the teacher, and subsequent individual study by the student. Traditional lessons are teacher-centred; the students listen to the teacher and subsequently study independently. The aim of the flipped classroom is to foster greater involvement, motivation and interest on the part of the students, improve the process of acquiring knowledge and skills, and enhance the development of competences. The flipped approach involves both elements of the teaching/learning combination and inverts the order. Instead of the teacher-centred instructional lesson, the students watch videos and work with multimedia and interactive materials beforehand. The individual study of the topics covered in the lesson is transformed into a session between the students and the teacher during which there is a phase of reflection and study, followed by the development and application of the contents of the lesson with the teacher's guidance.

We will begin by clarifying what is meant by the flipped model and approach. Certainly, one of the most accredited sources on the subject is the Flipped Learning Network, which, along with Pearson[2], identified the four pillars of F-L-I-P, which stands for Flexible Environment, Learning Culture, Intentional Content, and Professional Educator. The first of these four pillars is the *Flexibility of the learning environment*. In the context of the flipped classroom, the flexibility of the spaces is crucial to enable the implementation of educational activities which are different from those that are envisaged and permitted by the confines of a traditional lesson, in which the teacher—the only one with the right to speak—is at the front and in the center of attention, much like a priest or pastor in a church service. In this context, all the students are seated in narrow, rigidly fixed desks. In university classrooms, the rigidity of the spaces is often reinforced by the fact that the desks and chairs are almost always fixed to the floor, which makes it impossible to conduct a lecture following a different approach from the traditional, professorial one[3]. In the current situation, it is clear that the flexibility aspect must be modified and adapted to the conditions; therefore, in the case of a teaching activity conducted at a distance, the platforms used for the lessons should provide flexibility in the range of functions provided and in their use. Therefore, the flipped model needs to be adapted especially in the


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second phase– in the meetings with the teacher which must be carried out in synchronous mode with the teacher on the chosen digital platform.

Another of the fundamental elements required by classroom flipping is what the Flipped Learning Network calls a change in *Learning culture*. In the traditional model, the teacher is the main source of information—the only expert on the subject who provides the students with information. In the flipped approach, the students and their learning processes are at the heart of the lesson; the teacher assumes the function of guide and group leader, providing support in directing the activities. The teaching-learning dynamic undergoes a reversal in which the learning is central; therefore, the flipped model focuses first on learning, then on teaching. This aspect allows the teacher to use the classroom time more productively, paying attention to the individual learning needs of the students through cooperative activities of in-depth study and classroom interaction.

In order to make the reversal effective, attention must be paid to the third pillar of the approach: *Intentional content*. The teacher must prepare tools, videos and other suitable materials. The contents should be carefully selected and organized to maximize the student's understanding of the conceptual core concepts of the discipline, and also to encourage the development of a personal point of view on the issues addressed. Technological tools are the means through which teachers build a learning path of basic contents. Videos, ebooks and podcasts are made available to the student, who studies the contents and does exercises to grasp the fundamental concepts. This initial phase is done autonomously and before the session (online or face-to-face) with the teacher. The design of the materials is essential to allow for the best possible organization of classroom time that is to be devoted to various active learning strategies, such as peer instruction, problem-based learning and other tasks to develop proficiency, depending on the level and topic. There are several indirect teaching strategies that can be implemented in the classroom, such as: not providing solutions to advanced issues and problems; encouraging the systematic exercise of doubt; and contextualizing concepts from different points of view. In this way, the activities carried out in the classroom are aimed at fostering the development of complex aspects related to transversal competences and soft skills[4].

The design of the materials is linked to the last of the fundamental elements of the flipped model, i.e., the great *Professionalism required from teachers*. Regardless of what may be assumed at first glance, the flipped model requires a great deal of planning and careful design of the educational path, which must be based on the flexibility to adapt to the needs and requirements of students, which emerge over time and dictate how the lessons with the teacher should be delivered. In other words, the flipped classroom envisages and requires a high degree of adaptation and flexibility in the *adhocratically* inspired educational design. Derived from the Latin term *ad hoc*, adhocratic design means that the design of the educational path must be pragmatic and situational[5].

It would appear that the success of the flipped classroom approach in many educational institutions has increased the expectations that the model, being so innovative, will improve classroom activities and their outcomes. However, it must be pointed out that the model itself


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is not innovative in the absolute sense—rather, it has assumed the features of a technological variation of an educational method that has existed for generations. From the pedagogical point of view in a scientific sense, the central role of the student in the learning-teaching process and the relative need to review the roles and spaces of the teaching relationship have their roots in the solid ground of the activist educational renewal movement, starting from the works of John Dewey[6]—just to mention the leading figure—and in the constructivist learning models. In this regard, it is worth pointing out that the video lesson should not be considered the core of the flipped classroom, and even less the goal, but only the means through which the central role of the student should be re-established in the teaching relationship. However, there are no neutral means and this is all the more true for technological tools which, by definition, have the constraints of their design: a platform only allows you to do what the creators have foreseen, and there is never total flexibility.

What we have described so far is not easy to put into practice, especially in Italy, where there is still no pedagogical training for university lecturers. Therefore, in most cases, they teach on the basis of the traditional lecture format, which places teachers in the central position, invests them with authority and ensures that they may operate in their comfort zone where they need not question their own teaching method which is always the same every year.

In this regard, the flipped classroom calls into question what the great Italian linguist Tullio De Mauro called a *sacred trinity* that has presided over the life of the school and university in Italy for centuries: silent listening in class to the lesson of the teacher who moves between his or her desk and the blackboard to explain to the students what is already written in the book; individual study of the book at home and exercises to apply what has been learned; and questions and exams to check that the students have studied the contents of the book[7]. With the flipped approach, this *sacred trinity* is completely undermined and subverted in form and substance. The flipped scenario profoundly changes the traditional setting of the academic institution regarding the spaces, learning times and roles, and this requires considerable organization. The spaces need to be flexible to meet the needs of workshop activities and group work. No longer does the teacher impose the learning times of the contents—as happens in the informative teacher-centred lesson—but the individual students set their own learning times that subsequently dictate how the sessions between the teacher and the students should be organized. In this sense, the roles also change: the teacher becomes a guide and the student is active and responsible for his or her own learning path.

## 2. Some information on the state of the art

The first experiments that can somehow be traced back to the flipped classroom model date back to the 1990s and in particular to the pioneering work of Eric Mazur, a Harvard physics professor who today can boast almost twenty years of research on the subject[8].

The educational experience that officially sanctioned the creation of the flipped classroom model came a few years after Mazur's and took place in the school context. In 2006, two chemistry teachers at Woodland Park High School in Colorado, Jonathan Bergmann and Aaron Sams[9], started an innovative teaching/learning experience almost by accident when they


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started to record their lessons on video and shared them on the YouTube platform in order to allow absent students to quickly catch up on the content covered in the lesson. This move, which was made to respond to precise needs, had unexpected implications: the teachers noticed a sudden increase in the viewings of their videos, due to the fact that the students who had been present at the lessons had also started to watch the videos because they considered them a support for their home study and useful preparation for the tests.

Given the great success of their pedagogical experiment, Sams and Bergmann are now regarded as the creators of the model and have become the main promoters of the flipped approach through the development of the not-for-profit Flipped Learning Network™ (FLN) in 2012. Their aim was to provide educators with the knowledge, skills and resources to successfully implement the flipped model in their lessons. The number of teachers in this online practice community has risen exponentially; indeed, the authors themselves point out that only one year after its launch, the number of participating teachers increased from about 2,500 to more than 12,000.

The flipped learning pedagogical approach is very widespread in schools and universities, both nationally and internationally. However, despite its widespread popularity, the research that certifies the results is sometimes conflicting. Therefore, it is necessary to try to make some clarifications about the growth trend that led to the spread of this model.

One of the first scientific papers to introduce the flipped model and address it with a critical approach was published twenty years ago in the Journal of Economic Education[10]. The article describes an educational experience conducted in two phases according to a profile defined *inverted* that was already very similar to the flipped one.

Apart from the already mentioned experiences of Mazur and Bergman and Sams, there is no trace of any other experiments during the first decade of this century. Although research projects may indeed have been carried out, they were not specifically planned and published.

As pointed out by the analytical reconstruction of the literature on the subject conducted by Talbert[11], there has been an exponential rise in publications on the flipped approach in the last decade. In 2013, the Flipped Learning Network produced a white paper including a review of the literature on the subject published so far[12]. The white paper noted that the quantitative and qualitative research conducted scientifically on Flipped Learning was still quite limited and therefore not yet sufficient to demonstrate the validity of the approach.

Despite the lack of evidence of the validity of the flipped classroom in the strict sense, the document highlights, as early as 2013, the presence of a large amount of research that supports the key elements of the model with regard to the educational strategies of involving students in their learning. Among the research projects reported in the white paper in this regard, a particularly interesting one was conducted by Ramsey Musallam, a chemistry teacher in San Francisco and professor of education at the University of Touro, who investigated the effects of  preliminary study on students' classroom learning. His research shows that the students who had studied the material outside the classroom found it easier to learn new material in the classroom[13]. This and other studies suggest that preliminary study can be an


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effective means of managing certain aspects of the teaching situation, such as the cognitive load that a lesson involves for students, thus facilitating learning[14].

Numerous international experiences have shown that the flipped classroom is used in university education in various fields[15], such as statistics[16]. Many universities publish their courses on specially created platforms or on the educational channels of the main network providers, such as You-TubeEdu and iTunesU. As Cecchinato points out, among the most interesting initiatives on the subject, which are sparking a great debate on the higher education system in the United States, there are the activities of some startups such as Coursera, Udacity, and Udemy. These activate courses with hundreds of thousands of students (MOOCs, Massive Open Online Courses), devising new strategies for the production of educational materials[17], but above all reducing the financial burden for students and for the entire system[18].

In addition to the increase in the number of informative websites on flipped classrooms and platforms for video production and archiving, the last ten years have seen a large rise in the number of publications on the subject which express very different theories. The growth of the work on the subject has also led to the increase in the number of review studies on the present literature. Indeed, in addition to the already mentioned revisions of the white paper and Talbert's study, there are numerous other studies that differentiate between theoretical, empirical and evidence-based research, to which we refer for further analysis and a systematic review on the subject, which are beyond the scope of this article[19]. However, what is relevant to our analysis is the fact that these studies detect the presence of many experiences that seem to confirm the validity of the educational method of the flipped classroom in universities. Among these, the best known certainly include: the twenty-year research project conducted by Eric Mazur on peer instruction, which has already been mentioned in relation to the first experiments; the experimentation of the Digital Engineering course, carried out at California State University[20]; and a study by Stanford Graduate School of Education on neuroscience learning[21].

In spite of these positive experiences, the results of studies on the subject are not all in agreement and point to weaknesses in the model. The data collected so far do not allow us to univocally demonstrate a significant difference between the acquisition of specific and transversal knowledge and the skills of students in the flipped classroom compared to the traditional teaching method[22]. According to some studies, the flipped approach guarantees better learning results[23]. However, according to other studies, there is no significant difference between the flipped learning environment and traditional learning environments regarding the outcomes[24]. Other surveys show how the flipped classroom favors a good level of metacognition and the acquisition of collaborative learning strategies, but that these achievements do not persist over time[25].

What can certainly be reported in a positive sense is the educational research that supports the fundamental aspects of the flipped model, such as active learning, peer learning and constructivism in general. In this sense, the results of some studies show that the adoption of the flipped classroom: allows content to be communicated more easily[26]; brings about an


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increase in students' attention, involvement, and motivation[27]; improves the perception of self-efficacy[28] ; and helps students to develop critical thinking[29]. Other research shows greater student satisfaction by highlighting a correlation between a good perception of ease in the multimedia environment and the student's performance[30]. An interesting aspect revealed by the studies themselves is that the development of very well-studied flipped learning paths leads to an increase in the time required and above all in the relative costs regarding the preparation of digital materials and the arrangement of classroom furniture necessary to encourage consultations, exchanges, interactions and group work[31].
Studies conducted in Italian universities on the subject are still few and far between, but there has certainly been an increase in them. They look at the development of soft skills through the use of the flipped classroom and the possibilities of adapting the model to the Italian context[32].

## 3. The role of the student in the flipped learning model

Among the fundamental elements of the flipped model that require careful analysis and further study is certainly the responsibility that this approach requires of the students. A high sense of responsibility is a crucial issue for the success of this teaching model. Changing the role of students from passive users to active builders and interpreters of their learning pathways means that they must be aware of the scale of the commitment required of them. The fact that they are active means that they cannot transfer, delegate or procrastinate obligations and commitments; all this requires—and in some ways imposes—what we could call a *teaching contract*. If the students do not commit themselves to the critical use of the learning materials and actively participate in them, the construction on which the approach is based ends up collapsing spectacularly. If, on the contrary, students engage in the learning process guaranteeing constant feedback to the teacher, it will be possible for them to work on complex knowledge paths that enable the acquisition of superior knowledge and skills.
This element can be especially relevant in university contexts as it is in line with some of the indications of the Dublin Descriptors. In particular, the descriptors require students to be able to apply their knowledge, understanding and problem-solving skills to new or unfamiliar issues embedded in broader (or interdisciplinary) contexts related to their field of study. According to the descriptors, students should also have the ability to integrate knowledge and manage complexity, and make judgements on the basis of limited or incomplete information, including reflection on social and ethical responsibilities related to the application of their knowledge and judgements[33]. In this respect, we can see some similarities to the flipped method which requires students to face significant and concrete problems, identify strategies for their solution, and produce arguments to justify their theses. To foster the development of these skills, the flipped approach adopts research-oriented teaching methods, such as Inquiry Based Learning and Peer Learning, designed not as separate methodologies but as integrated ones.
Over time, attempts have been made to refine some aspects of the flipped classroom method that had revealed some limitations. In particular, one of the main critical aspects of the first experiences was certainly the synchronicity of the use of the contents, which determined a high degree of rigidity throughout the model and did not take due account of the difficulties of


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connection and time management of the students regarding the viewing of the video. Therefore, in order to try to overcome this issue, over time there has been a spread of the so-called asynchronous approach (flipped-mastery classroom), in which the constructivist elements of the methodology are enhanced by the change of the first phase. It is no longer necessary for the students to follow the video lesson at home at the same time in order to discuss it and work on it afterwards, but from the very beginning the students are stimulated by problems and projects. Subsequently, both independently and with the teacher, they look for the sources of the knowledge needed to complete the assignment successfully. The students watch the videos and use other materials during the research activities. The students themselves progressively become *content creators*, as they in turn produce videos and podcasts, thus enriching the amount of resources available to their peers. This asynchronicity makes it possible to increase the personalization of teaching for each individual student while respecting learning times and cognitive styles[34].

## 4. Classroom flipping and digital teaching aids

In spite of the great importance of the use of technological tools in the educational practice of the flipped classroom, we should emphasize that this is not the central aspect of this model; it is one of the features that allows the inversion, while the focal point remains the learning process and the design of the educational path to be carried out in the teaching sessions, whether online or face-to-face.

However, the fact that these tools are not at the heart of the model should not stop pedagogical experts from making a critical reflection on their use, since technological tools cannot be considered simplistically as means with a neutral nature. Not only are they mediators of the teaching relationship, but also intervening variables in the learning-teaching process, since their characteristics and design are decisive elements of teaching methods. The use of one particular platform or app rather than another brings with it all the structural characteristics of the device in the actual teaching situation, allowing, preventing or characterizing the carrying out of some activities, and enabling a particular form of interaction. The medium, in a single training device, is potentially all one with the training objective; it is its co-constructor in terms of conception and configuration.

Another crucial aspect to reflect on with regard to the relationship between the flipped method and technology is the fact that in order to be flipped, it is not enough to use technology without changing the lesson structure: a lecture can simply be recorded and transmitted online but this does not mean innovation—it just means changing the channel. This simple change of channel is what happened, unfortunately, during the emergency situation caused by the SARS-CoV-2 pandemic. However, the simple recording of a lesson allows the teacher to intervene only on the time variable because students can watch the video several times, at different times, disconnect from it when they are tired, and so on. Nevertheless, this is not and cannot be educational innovation.

Studies on audiovisual and multimedia languages in the field of education have proved their effectiveness[35], which has led to the proliferation of digital video resources packaged in a


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standardized way and made freely accessible online. There are many such sites on the Internet. Youtube—the most widespread video production channel in the world—has built a service for teachers offering videos organized by subject and school level. One of the most utilized—and at the same time, one of the most criticized—is Khan Academy, which has set up a system of rewards for users of simple online lessons, awarding accolades based on the levels reached, similar to that of video games[36].

The wide diffusion of these platforms should lead us to reflect on the fact that teachers who promote the flipped approach use the videos on these channels. Although the materials on these platforms offer the users of the network the possibility to get valuable information on different topics, reducing time and costs compared to the past, nevertheless they have many critical aspects. These particularly concern the standardization of the materials, which do not take into account the characteristics of the users and the educational context, and therefore betray the fundamental principle of the customization of education and the need to value individual differences. Therefore, it is decidedly more appropriate that the production of video lessons and digital resources for the design of flipped approaches be done by individual teachers. With this strategy, products would be created that meet the specific needs of content design according to a methodology based on the individualization of the students' learning paths. The development of videos and digital products by the teachers responsible for the educational program should also enhance the processes of educational and methodological innovation, and the way each teacher communicates with the students. However, it presents a critical aspect, which is the need to have adequate technological and methodological skills that are completely different from those required to conduct a traditional teacher-centered lesson.

## 5. **Critical aspects of the flipped learning model**

From this brief examination of the flipped learning model, many critical points have emerged; these should be further investigated so that a progressive development of this methodology can be implemented and the risk of the standardization of the model avoided.

The scientific literature on the subject has shown evidence of some critical aspects of the flipped model. The main problematic aspects concern infrastructures, the quality of video resources, the digital skills of teachers and students, the cognitive load that the model could introduce and the general learning culture.[37]

The first aspect we should reflect on is the choice of the educational contexts in which the flipped model may be more successful in terms of improving learning processes. As the literature on the subject specifies, the flipped approach may not work in the same way for all teachers and all students in any context. The creators and promoters of the model themselves, Bergmann and Sams[38], note that flipped learning does not appear to be suitable for the design of entire courses for lower school levels, but should be limited to individual lessons or learning units. Moreover, with regard to higher education courses, some difficulties were found in the application of the method in basic or introductory courses. The critical issues concern the lack of interest that students may have in a subject that as yet they know little about, as is the case in introductory courses, and the fact that students themselves may not have the necessary


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skills to work with authentic tasks in problem-solving mode on issues that are not yet clear. To this regard, in a study conducted with university students of a flipped introductory statistics course, the participants reported that they were less satisfied with this method than with the traditional teaching one, because after watching the videos they felt ill-prepared to work on topics according to the strategies of problem-solving[39]. It is clear that the approach cannot always be used effectively in all cases but requires us to take due account of the specific context and the user to whom the flipped approach is addressed.

Along these lines, there is also another element of concern regarding the students' lack of preparation regarding the different ways of using the materials and processing knowledge. We have had the opportunity to see for ourselves the consequences of this lack of preparation in the use of technological aids in teaching and studying during the months of impromptu distance learning caused by the Covid-19 crisis. Many students found themselves completely unprepared regarding the use of digital platforms, and therefore were unable to make the most of their potential to improve their learning paths. In the same way, it is not feasible to consider starting a flipped course without adequate preparation in the use of the tools from a technical point of view and regarding their use in teaching and learning.

Among the basic characteristics of the flipped training model, another element that requires careful pedagogical reflection concerns the accessibility of knowledge as a dimension of the democratization of knowledge, which is often mentioned among the objectives of all those specialized online platforms. However, this not simply a matter of means and tools. When we talk about accessibility and the use of multimedia content, we should not suppose that the fact that young people frequently use digital tools is enough to make them competent, critical users of content on all topics. We must avoid the assumption that it is age—specifically young age—that dictates technological competence. Many young people may indeed be digital natives, but that does not mean that they have mastery of all the digital tools for learning or the ability to distinguish good content from mediocre content.

Moreover, although content sharing seems to respond to the logic of a democratization of knowledge, another area of possible inequality regarding access to the network has appeared: not all students have access to high-speed internet or, in some cases, even to technological devices such as tablets and personal computers. Focusing teaching on the use of technological means brings with it the risk of putting the weakest students in difficulty both from a socio-economic point of view and a socio-cultural one. Using the learning materials in the solitude of one's own room can have a strong stigmatizing impact and make social and cultural differences emerge even more strongly.

The implementation of cooperative activities, discussion and knowledge building in the classroom, which make it possible to work on aspects of learning at a higher level than the simple acquisition of content, requires all members of the group to have mastered the knowledge because each participant must make his or her own contribution. These difficult aspects can only be resolved through careful educational design that takes into account the knowledge and skills of the students so that the teacher can plan suitable ways of interaction


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between peers and assess the relationship between the learning objectives of each student and the goals to be achieved for all.
The risk of perpetuating inequalities among students is also known to Bergmann and Sams[40]. Concerning this possible risk in school contexts, they argue that regarding Mastery Learning, the flipped approach can help to combat inequalities through the differentiation and individualization of classroom activities with the support of the teacher, using different timeframes and by developing remedial activities. Regarding one of the most problematic aspects of the flipped approach noted by its most severe critics—i.e., that it may exacerbate the distances between the starting points of the students—the two American scholars say that the opposite is true. They claim that both the traditional teacher-centered approach and the use of mainly verbal communication channels widen the distances between the starting levels of the students.

## 6. Strategies and suggestions for the implementation of the flipped model in the new scenario of university education

What has been briefly described so far enables us to understand some of the strengths and weaknesses of the flipped learning pedagogical model and, in particular, allows us to see the possibility of adapting this model to the new teaching situation we are experiencing. Bearing in mind all the limitations of a large-scale use of technological and digital media in education, nevertheless, the situation demands that we make exclusive use of these tools. Therefore, we should do so carefully and within the context of teaching models that are scientifically valid, despite their different applications and limitations. Regardless of the particular situation, it is essential that teaching activities are not dictated by forms of improvisation or by the even more simplistic shifting of traditional lessons to digital platforms. In this sense, the flipped learned model can be a resource to draw on in order to redesign teaching activities—both face-to-face and in distance mode—according to new forms of active participation by students.
In order to try to overcome the general limitations found in the literature so far, the following teaching strategies should be implemented to design the courses according to the flipped approach:

- the design and creation of videos by teachers;
- specific technological training for teachers; and
- the activation of media education courses for the students.

Despite the well-meaning proposals of the digital sources on the popular channels, it is advisable for the teachers themselves to create the teaching videos and other teaching aids in the first phase of the flipped method. This would avoid the risk of the standardization of technological educational materials and the hypostatization of learning styles, and favor a critical approach to knowledge. The students would also find them easier to follow since they are familiar with their teachers' methods. Therefore, the creation of videos requires the teachers to be trained both from a technical point of view and from a pedagogical point of view, in order to avoid creating videos according to the same methodology as traditional teacher-centered lessons, which would defeat the objective.


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Effective flipped teaching experiences require not only specific training for teachers, but also preliminary training for students, who, as noted above, must be active and aware of the responsibility that comes from adopting this learning approach. To this regard, media education courses should be created, focusing on an approach that aims to educate through and to the media[41]. Training paths should be designed according to a variety of forms and codes in view of the fact that the skills related to these media should be considered as indispensable social skills[42], given the pervasiveness of the media.

The educational design must also try to meet the different educational needs of the students: the first stage, when students all study independently at home while watching the same video, must lead to a different design of the subsequent educational path in the classroom to avoid the risks of stigmatization and aggravation of socio-economic differences and instead to respect the differences in learning styles and times.

In addition to these general indications, it would seem necessary to define a number of concrete points in order to implement the use of the flipped approach in our universities in the new emergency scenario which will oblige us to conduct distance learning for a long time to come

As suggested by the analysis conducted by Raffaghelli according to the evidence-based method, for the activities in the first phase—conducted in asynchronous mode and individually—the role of feedback is central and should be immediate and of two types: formative quizzes and simple learning analytics to self-monitor progress in independent activities. To these should be added explanations associated with "what happened" in the online activities. This strategy would combine the positive effects of feedback with metacognitive strategies[43].

In the second phase of the activities, which normally takes place in the classroom, but which we are placing here on distance learning platforms, the teacher must aim to work with the knowledge the students have already acquired in the first phase. In order to do this, the teacher must "study" the results of the online activities and start the lesson on the basis of the critical points detected. In particular, the teacher should ask the students for feedback in order to understand whether the materials provided are adequate and, if necessary, intervene to clarify any doubts or concerns.

The implementation of the lesson on the platform must be geared towards putting knowledge into practice in a collaborative manner. In order to make this type of activity possible, almost all online teaching platforms allow the creation of ‘breakout’ rooms in which smaller groups of students can work calmly on challenging problems or inquiry-based activities through peer tutoring strategies. It is clear that the choice of strategies to be adopted must be made very carefully by the teacher according to the specific features of his or her discipline and the precise subject of study.

The specific scenario of the platform requires the teacher not only to carefully plan the resources and sequences of the learning design, but also to consider the specifics of the platforms used. As already mentioned, these training spaces are by no means neutral. They are real mediators of the learning process since their design determines what can be done and how


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it can be done. Therefore, in order for these spaces to become true learning environments, according to the constructivist definition, the teacher should facilitate the establishment of a good climate of communication and collaboration.[44]
This same constructivist-inspired attention must also be paid to assessment activities, which must obviously be closely linked to the objectives shared with the students. For the configuration of the evaluation model, on the basis of the literature on the subject, it is advisable to adopt integrated models that combine the results of individual and self-assessment tests, relating to the first asynchronous phase, with an overall formative evaluation activity that has been shown to have good effects on reflection and student learning[45].

## 7. Conclusion

In this historical moment when research and educational practice on the themes of education mediated by technological tools is becoming widespread, we must ensure that this attention is not translated into a trivialization of the educational process and into a search for innovation entrusted to merely instrumental practices. The change brought about by the current situation, which has led to a large-scale use of technological means, can become an important opportunity for rethinking teaching methodology, especially in a training context such as universities which have always been anchored to the traditional teaching model. In this regard, in-depth analyses and detailed studies should be carried out in order to systematically organize the teaching models that make use of technological tools. We believe that the flipped model can also find an appropriate place within this systematic organization, but only on condition that its implementation leads teachers to redefine the parameters of their discipline, taking into account the needs of their students, since acquiring strategies for new means of communication represents a real challenge to the established professional skills of teachers and, therefore, requires appropriate training.
In particular, the path conducted so far has clearly shown the possibility of putting the student at the center of the educational path through the flipped model. However, in order for this crucial role to actually materialize and be experienced by the student, scientific research on the subject must be continued in order to maximize the strengths of educational practice and minimize the critical points detected.

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