

Models of teaching and learning: digital evolution during the Covid-19 pandemic

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Abstract

The introductory part of this article will focus on the value of e-learning and how it is applied in modern schools. It will underscore how, during the Covid-19 pandemic, innovative teaching methods both in-person and purely online have been useful in guaranteeing students' right to study. The second section will use a theoretical narrative method to analyze the various models of innovative teaching and learning in vogue. Finally, the concluding part will discuss the vivid importance of increasingly technological, digital, and media-based teaching in contemporary schools.

Keywords 1

Digital learning, innovative methodology, teacher training, technology.

1. Models of teaching and learning: digital evolution during the Covid-19 pandemic

The experimental game has been confirmed as one of the most advanced innovative teaching methodologies. The playability, interactivity, clarity of objectives, and usability of a multimedia artifact focus the attention of the subjects to such an extent that typical effects of the flow experience, such as loss of temporal cognition, are experienced. Games of this type provide increased attentional skills and a sense of control over the educational-media experience.

Use of the game leads to positive learning results, including an increase in users' aptitude to explore and propensity to interactively acquire new knowledge.

The design and use of digital learning places is inspired by experiential learning and reflective observation (learning circle), which reflects elaborations on the work of Piaget, Lewin, Dewey and Kold.

An interpretative / application model aimed at designing the Experimental game was provided in 2015 by Kiili [1]. This archetype is aimed at guaranteeing the learner an opportunity for the acquisition of skills and knowledge by resorting to direct experience with gameplay. This processing is the result of a cognitive-behavioral approach, as was deduced by Van Eck when he asserted in 2006 [2] that learning can be defined as the construction of cognitive structures through action.

The knowledge acquired by the subject by playing experiential games is not prefigured as purely theoretical educational objectives because game challenges achieved through competition keep the users' level of concentration high. A socio-constructivist approach through the use of collaborative groups in the use of gameplay makes the lessons more productive. The reflection and development of critical thinking in students can instead be attributed to student participation in further group actions, such as online conversations or focus groups.

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The search for solutions at various game levels inevitably increases the user's skills and knowledge of the subject matter. The interaction with the system allows the user to consolidate previous knowledge and then acquire new knowledge. Furthermore, the user, mastering the system, develops digital skills and gaming skills that can be applied to problem solving.

The concepts of Serious game and Edutainment are of significant importance for understanding the evolution of the game-based approach. The former are educational games attributable to the playful method, characterized by a mixture of fun and learning objectives [3] (Charsky, 2010). The logic of the games can be reduced in quality (and thus made less logical) in a competition to verify the knowledge learned through quizzes (Mentimeter, Kahoot) in which users experiment with decision-making or problem solving [4] (Dipace, 2016). Edutainment corresponds to a set of didactic strategies resulting from the union between education and fun in the learning phase. The peculiarity of these methods unequivocally lies in translating learning into a playful key, relying on atavistic intellectual processes typical of the stage of children's cognitive development. According to recent experiments, edutainment guarantees greater educational effectiveness and efficiency when applied to e-learning as well as in training in companies, as it is able to ensure the acquisition of transversal skills useful for solving concrete and real problems. Jain [5] (2011) argues that this method, through the use of media tools, uses the logic of simulation to train, prepare, and educate the adult population in carrying out the tasks of their profession. In a systematic review by Sauv e, it is possible to trace the main characteristics of educational games and simulations augmented reality. According to these analyses, the particularities that distinguish educational games from other games are five: choice of the player, conflict, rules, predetermined objective and artificial nature of the game. Thanks to these, if properly identified and programmed, learning is strengthened by revealing its educational purpose. From a pedagogical point of view, learning through the game improves the skills of the individual and the group through cooperation and team play. The conflict and competition typical of this method motivate the individual subjects to engage in performance aimed at maintaining the status and role they have acquired up to that point [6] (Barab, 2005). The rules, at the basis of the competition, are accepted by the player as an essential component of the game, without which it would be impossible to define the objectives, the trajectories of winning, exclusion of players or the conclusion of the game. A final feature is the game's fictional quality, which is essential for having fun, although not all games would exclude the re-proposition in real life of the activities proposed in a sort of hybridization, as in the simulations described above. In the literature [7] (Jancic, 2019; Boghian, 2019), substantial differences have arisen between educational games, i.e., games whose goal is to hide learning behind a challenge between competitors, and didactic games, in which the challenge is learning. Those skills are then applicable to real life contexts. The concept of simulation, much debated in contemporary literature, refers to four different interpretative models: (1) systemic model: simulation provides feedback to players in its learning environments, (2) dynamic model: characterized by constantly evolving feedback and places of interaction with players, (3) simplified model: there is no faithful and articulated representation of reality but only a simplistic representation of reality, and (4) 'accurate and valid' model: reproduces and slavishly represents physical and functional characteristics. Although it corresponds to a simplified representation of reality, the designer is required to predict what the outcomes will be in terms of training.

Some studies overlap game-mediated learning with simulation-based games, a method used in the case of problem-based learning, which was born in medical schools and subsequently extended to other scientific fields. We see a dual purpose in simulated learning: to repeat the actions learned without limitation and then, when you have become familiar with how to master them, to replicate those actions. Context-based learning is another contemporary simulation-based method. The CBL represents theoretical concepts with real life examples; this approach replicates environmental and social situations aimed at ensuring the acquisition of new knowledge. The assimilation of knowledge is determined by the collective activity of people sharing the same educational purposes [8] (Hansman, 2001). Contextual learning has been widely used in Anglo-Saxon training environments, demonstrating how in a simulation context the participants experience less stressful conditions and performance anxiety. Other forms of simulation-based education are widely used in the training of first aid and first aid professionals.

From a psychological, linguistic, semantic, syntactic, grammatical, anthropological and cultural point of view, communication has always been vital for human beings and their education. An innovative

language teaching / learning method, without a doubt, is task-based learning (TBL). Ellis [9] (2003) systematized this model by basing it on the dual scope of learning through the assignment of tasks, as well as through teaching, thus describing the procedure to be adopted so as to make TBL effective and efficient in achieving these objectives. This method is based on the application of authentic language and the request to carry out significant activities through the use of the target language [10] (Foster & Skehan, 1999). The activity of the TBL is aimed at carrying out classwork that involves all students in the design, understanding, manipulation and production of a shared paper, focusing the students' attention more on the meaning of the activity than on the literal signifiers [11] (Costa, 2016). Planning starts from four specific characteristics: (1) the activity focuses on the pragmatic meaning of the project carried out; (2) the task involves a gap; (3) students independently choose the resources necessary to solve the task assigned to them; (4) moreover, the activity must not represent a mere linguistic exercise. What is meant by 'gap'? Prabhu [12] (1987) identified three types of gaps: the first relates to information and therefore to the decoding of information and messages from an emitter, who holds them completely, to a receiver, who really only understands a part of them. The same activity can be proposed through the use of written texts in which the information is addressed in a broader way. The second type is the reasoning gap in which once an objective has been set, the procedures and practical actions to be implemented to achieve it are planned (e.g., organization of a dinner or the planning of an event). The third is the opinion gap, in which, after having become aware of certain information of social value (e.g., news and news stories), young people engage in debate by sharing their ideas and preferences on the subject.

Returning to Ellis [9], there are three stages in his planning model. In the first phase (pre-task), the teacher presents the topic to the class with the help of dictionaries, making the TBL resemble a traditional lesson. The second phase (task) is the central and most important one as that is when the students are required to carry out the task, generally in small groups. The teacher becomes a mediator. It is important to underline that the observations of the students doing their work are important for the teacher's evaluation. In the third phase (post-task), students will deliver their papers by providing proactive feedback to the teacher. As in the case of project-based learning, task-based learning can be used in the short term (half lesson or even one) and in the medium-long term (for a week or throughout the school year). Compared to the traditional model, there is no behavioral approach in the acquisition of a new language following a stimulus-response scheme, but a free structuring of speech, as the goal is to develop language skills in a creative way. The student's autonomous and self-determined learning is functional because it recreates real life situations. A similar strategy ensures that students are made aware of the semantic and functional value of the foreign language by not only relying on grammatical rules. Obviously, there was no lack of criticism of this approach for being too focused on content and too little on form [13] (Beard & Castañeda, 2019).

Since 2005, this teaching method has evolved and been digitized, becoming a "virtual TBL," guaranteeing the learning of a foreign language even in a virtual classroom. Tables 1 and 2 show an increase in training on ICT and distance learning issues in post-covid and an increase in the use of devices by teachers compared to pre-covid in Italian context [14].

Table 1 ICT training e use of distance learning in Italy

	BEFORE COVID	POST COVID
TRAINING IN INFORMATION AND COMMUNICATION TECHNOLOGIES	49%	69%
DISTANCE LEARNING	11%	89%

Source: *Ranieri *et al.* 2020

Table 2 Use of device in a post-covid era 2020.

DEVICE	%
VIDEOCONFERENCE	85%
E-REGISTER	64%
ASYNCHRONOUS AUDIO-VIDEO RECORDINGS	62%
VIRTUAL CLASSROOM	56%
E-MAIL	36%
BLOG	11%

Source: *Ranieri *et al.* 2020

Through the modalities of task-based learning, which considers real problems and requires students to work in the small groups typical of problem-based learning, team-based learning was born thanks to Michaelsen, Knight and Fink in 2004 [15]. The method was aimed at assisting students with assimilating skills in the field of marketing, avoiding overcrowding in university classrooms and ensuring engaging learning experiences for students. This method is both teacher- and student-based because the teacher prepares the contents that the learners will have to create; students will be required, as in the flipped classroom, to produce a paper by collaborating in small, autonomous groups. In team-based learning, students are sorted into permanent groups, organized so that they complete all the learning units provided for in the entire cycle. At the end of this, they will be given the RAT, which is a test aimed at ascertaining the individual and group preparation of students in mid-term. An answer is given to each of the test questions, if students disagree with the answer, the group can propose an appeal. Once the teachers has seen the individual appeals, the teacher evaluates the well-motivated ones while in the last phase he dispels the various doubts of the students regarding the answers achieved and their possible appeals.

The TBL has four key features: (1) groups must have access to adequate resources and in order to be profitable they must be as diverse as possible, (2) students in this method are individually and collectively responsible to the group and the teacher, (3) the assignments must fulfill two functions, namely, to promote learning and cohesion among group members, (4) feedback is very important to ensure that students are effectively learning and memorizing content [16] (Httie & Timperley, 2007). The European Commission recently recommended inquiry-based learning. In this method, students ask questions to scientifically and critically prove the requests posed to them by the teacher, extrapolate their own interpretations from these conjectures and finally communicate explanations for the choices they have made. According to the 2008 Banchi and Bell model [17], teachers must first investigate which method is most appropriate to apply to the research to be carried out by subjecting students to games. It is important that students feel motivated to make this method be meaningful for them. There are four investigation activities based on the process of undertaking investigation for learning purposes: (1) confirmatory investigation based on experienced topics and events, the results of which are predictable. The teacher guides the learners during the investigation phase. These activities, albeit guided, will independently produce the results of the survey. (2) Within the structured survey, both the hypothesis and the research method to be applied are provided by the teacher. (3) In the 'guided' one, the teacher becomes less involved; in fact, they only formulate the problem to be solved, and the procedure used to find the solution will be defined by the students. (4) The open investigation, considered the most refined, requires students to identify both the issue to be investigated and the procedure to be applied. This methodology can only be applied when students are fully competent in applying the previously reported methods—in fact, it turns out to be the most difficult to implement.

2. Authentic evaluation and training reform in higher education

The skills developed through the use of computer-based methodologies require a suitable evaluation method [18] (Arter & Bond, 1996). Generally, this moment in education process is considered final and objective for the verification of the knowledge acquired in educational contexts.

The lack of valid theoretical foundations for the evaluation of the teaching and educational performance of students created a critical docimological debate that resulted in the Authentic assessment. This was born in the United States in the early 1990s, with the aim of guaranteeing an objective estimate of the skills acquired by students in real life circumstances. In this regard, Wiggins [19] (1990) asserts: “Evaluation is authentic when we directly examine students' performance on substantial intellectual tasks. Traditional evaluation, by statute, is based on indirect ‘questions’ or with an intermediary - efficient and simplistic substitutes from the real, from which we believe that valid inferences can be made on the student's performance in those challenges” (p. 1).

In line with the principles of constructivist philosophy, Wiggins argued that evaluation is important as it is useful to improve the student's performance, supporting them in the learning phase so as to assist them in acquiring significant knowledge. There are five fundamental characteristics of the authentic assessment: the authentic learning tasks, the environmental context, the social structure, the evaluation criteria and the results to be achieved [20] (Gulikers, 2004). This evaluation process is aimed at training students by helping them to be actively involved in completing real tasks. Therefore, the evaluation must be designed backward in such a way as to facilitate the organization of the school curriculum according to these characteristics [21] (Ashford-Rowe, 2014).

Teachers are required to plan in advance the performances that the learners will have to perform, and they design the curriculum while taking into consideration the skills involved. According to Darling-Hammond and Snyder [22] (2000), there are four evaluation tools to keep in mind when organizing the curriculum: case study, performance exhibition, portfolio and action research.

Teachers who use the authentic performance and assessment system give their students the opportunity to conceptualize what they have learned in real contexts by building knowledge from these results. This procedure allows the educational experience to avoid the danger of mnemonic learning being decontextualized from real contexts. Reflexivity is the central component of the evaluation. In hetero-assessment, the assessment is conducted by an external party. In peer-assessment, the evaluation is the result of the judgment of a peer. In self-assessment, the person assesses themselves. In self- and peer-assessment, the student develops reflexive skills, which give them greater awareness of their own strengths and weaknesses up to the full achievement of metacognitive skills.

As Limone [23] (2012) claims, self and peer assessment make it possible to 1) help students understand and share the effectiveness and validity of these approaches, 2) ensure the reliability of the judgment, and 3) optimize students' opportunities to learn from colleagues and from self-assessment.

In self-assessment, the student's self-esteem plays a central role since, as Hewitt [24] (2002) points out, high self-esteem levels can lead to an overestimation of the assessed subject. On the contrary, low levels of self-esteem could produce a devaluation of the same.

CONCLUSION

Following the big bang of the Covid-19 pandemic, many sectors of daily life have been disrupted in time and manner. In particular, the sector of teaching and learning methods has undergone a rapid transformation due to e-learning having become a substantial channel for delivering learning in all segments of training. Even more interesting is the international debate that concerned the digital evolution of innovative teaching methodologies traditionally used in person and that undeniably require a critical rethinking phase with respect to the first avant-garde experiments in applying those methods to teaching done through an online platform [25]. Compared to the Monya's survey of 2021 [26], although the increase in the use and training of ICT is certified, the increase in the perceived fatigue of teachers in distance learning is also an interesting fact.

Table 3 survey on ICT in 2021

SURVEY	%
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USE OF I.C.T. (INFORMATION AND COMMUNICATION TECHNOLOGIES)	75.1%
T.I.C. TRAINING	94.4%
ADEQUATE SPACE AND TECHNOLOGY AT HOME	67%
INCREASED PERCEIVED WORKLOAD	87% (OF WHICH 84% IN RELATION TO DISTANCE LEARNING)

Source: *Monya, 2021

Studies have shown how to propose innovative teaching methodologies, including digital ones, that overturn and redefine the teaching of lessons in the classroom and has produced a series of relevant results in terms of academic success. Re-structuring an innovative teaching method in the media field, such as those presented in the previous paragraphs, means taking into consideration a series of fundamental elements necessary for its transposition into a virtual learning environment. At the base of these innovations, a recurring element within the educational proposals is the presence of narration (as a pedagogical category), which becomes a form of transmedia thanks to a pervasive diffusion of digital technologies even in places and times outside of school [27]. Using translations of innovative teaching methodologies to an online version has meant the need to plan an educational intervention using multiple languages (multimodality) and different cultural products (multiliteracy). Experimenting in a huge world distance learning laboratory (during the pandemic) has still meant reflecting on the real need to anchor the school of the future with the unprecedented mission of developing unexpected skills in an ever-changing economic and social context, to a model of seminar teaching that can and must integrate the professionalism of the teacher and trainer.

The rethinking of face-to-face teaching also involved a greater openness of the teacher's perception towards the use of blended learning in normal post-pandemic teaching practice. An interesting example is represented by the diffusion of the station rotation method in schools. The definition of this methodology does not naturally arise in the pandemic period, but, starting from 2017, important experiments in American schools can be found in the literature. Basically, this method involves mixing face-to-face lectures with online teaching, alternating individual work with group work. The predisposition of the setting is central to the teaching process, since without a preventive organization of the space it is not possible to obtain relevant results in terms of the effectiveness of the learning process [28]. Specifically, the class is structured to provide 3 or 5 work areas (stations) in which students take turns performing tasks or that are logically organized in 5 different steps or that have the same task being carried out using 5 different languages and communication methods. It has been shown above all that in this latest version of the organization of the educational intervention, even students with disabilities show increased participation in classroom activities and academic success with an increase of over 194% (source: eduscopia 2017).

The heart of the debate today, therefore, focuses on capitalizing on all the experiences and skills gained in the last two years of the pandemic to organize an innovative school teaching model that is able to exploit all the results and attestations of effectiveness produced so far. Trying to make teaching, and therefore the school, a hybrid system is a challenge. However, a perspective that looks towards the future includes the idea of online and face-to-face activities being not only alternated as tools but coupled with methodologies that provide for the rethinking of and adaptation to use in real and virtual environments. However, the hybrid didactic organization does not only mean alternating between online and digital, it also means a new specific learning space in which synchronous and asynchronous are also mixed and thus both on-site and remote students can participate at the same time in learning activities. Because synchronous hybrid learning is relatively new, few studies have investigated its use and effectiveness.

In this long phase of experimentation, the advantages of face-to-face interaction have also emerged, and it is undeniable that all the actors involved in the training process (parents, teachers and students) have easily adapted to the use of the new educational platforms. Hybrid learning is an approach that

combines traditional face-to-face classroom learning and online learning methods that need to happen simultaneously. This model also represents a future solution for those students who for some length of time are unable to reach the physical space of the school or can only attend part-time, without compromising the study of the contents provided or the educational relationships [29]. Hybrid learning, therefore, does not remain an emergency solution to a problem but is structured as a new strategy in the educational system for which it is necessary to implement measures and strategies to improve its effectiveness and meet the future needs of the school. In the first instance, it is essential to improve connectivity in schools and provide adequate training for teachers in the use of new technologies. Offering secure access to data is one of the main problems of the school for which security must be guaranteed when granting students access to data while blocking their access to unacceptable content. In addition, sensitive information in the student database should be protected from cyber-attacks and malicious breaches. Finally, to achieve continuous learning it is necessary that, even at home, students have an internet connection that allows them to continue teaching activities, even if only through a smartphone.

An undisputed advantage of using hybrid learning in the school context is the ability to easily monitor student progress through special dashboards and assess the strengths and weaknesses of the teaching interventions themselves. Therefore, getting immediate feedback allows teachers to make the necessary changes and at the same time meet the needs of the students. Furthermore, the ability to create individualized courses and modules allows you to achieve the much-desired personalization of teaching interventions in the context of the classroom, overcoming potential learning barriers [30]. A hybrid learning system is also more engaging because, in addition to incorporating interactive media, it allows the use of innovative teaching methods much more easily than does traditional face-to-face teaching. Although the dimension of the presence of hybrid learning allows you to develop additional skills that help in social interactions, the use of online media facilitates the deepening of content through access to more diversified teaching material and finally allows students to have flexible hours for all school activities. The various editions of the PNSD (last note n.722) have strongly focused on the diffusion of inadequate technological tools in the classrooms, in the strengthening of digital skills and STEM disciplines, and finally in the innovation of teaching methodologies with IBL or PBL that support both 'teaching of scientific disciplines and soft skills.'

The elements on which future research and important didactic experimentation will be carried out on the following: firstly, the considerable difficulties in involving and keeping the attention of students active even when the latter are not physically in the classroom. One possible solution that teachers in blended (or hybrid) learning could go through is to focus on activities that can increase engagement, such as discussion groups or intermediate tests, but also through engaging technology platforms such as live streaming and screen sharing. A second challenge is predicting the onset of technical problems that can interrupt the flow of the lesson and interfere with students' access to information; therefore, it is important to not rely on only a single (digital) communication channel. Also, in the latter case, it is to have pre-programmed activities that overcome any obstacles the instructor might encounter. Finally, the problem of facilitating collaboration, teamwork and social interaction is a significant challenge for hybrid school models [31]. However, the technology can help solve barrier collaboration by incorporating synchronized communication via live streaming and online chat, thereby duplicating the benefits of personal interactions. Furthermore, sharing teaching materials can be quite challenging in hybrid models due to students using different learning software. Therefore, there are situations where a distance learning student and the one in the classroom cannot collaborate with similar teaching materials, thus causing potential delays and interruptions. Solving this problem requires the standardization of educational technology to allow easier access for all learners and to promote consistency in achieving learning outcomes.

2. References

- [1] K. Kiili. Digital game-based learning: Towards an experiential gaming model. *The Internet and higher education*, 8(1), 13-24. (2005).

- [2] R. Van Eck. Digital game-based learning: It's not just the digital natives who are restless. *EDUCAUSE review*, 41(2), 16. (2006).
- [3] A. Anzaroot, McCallum, UMass citation field extraction dataset.. URL: <http://www.iesl.cs.umass.edu/data/data-umasscitationfield>. Fang, N., 2018. "Student Experiences with Collaborative Problem-Based Learning (CPBL) in a Second-Year Undergraduate Engineering Course". (2013).
- [4] S.C. Santos, E. Santana, L. Santana, P. Rossi, L. Cardoso, U. Fernandes, C. Carvalho, and P. Tôrres. "Applying PBL in Teaching Programming: an Experience Report", FIE, San Jose, USA. (2018).
- [5] L. C. Jain. Serious games and edutainment applications (Vol. 504). M. Ma, & A. Oikonomou (Eds.). London: Springer. (2011).
- [6] S. Alonso; I. Aznar; M.P. Cáceres; J.M. Trujillo; J.M. Romero, Systematic review of good teaching practices with ICT in Spanish Higher Education. *Trends and Challenges for Sustainability. Sustainability*, 11, 7150. (2019).
- [7] M. Kalogiannakis, S. Papadakis, & A. I. Zourmpakis. Gamification in science education. A systematic review of the literature. *Education Sciences*, 11(1), 22. (2021).
- [8] J. L. Jensen; E. A. Holt; J. B. Sowards; T. H. Ogden; R. E. West. Investigating strategies for pre-class content learning in a flipped classroom. *J. Sci. Educ. Technol.* 27, 523–535. (2018).
- [9] R. Ellis. The methodology of task-based teaching. *Asian EFL journal*, 8(3), 19-45. (2006).
- [10] A. J. Moreno; J.M. Romero; J. López; S. Alonso. Flipped learning approach as educational innovation in water literacy. *Water*, 12, 574. (2020).
- [11] A. Sánchez-Caballé; M. Gisbert-Cervera; F. Esteve-Mon. The digital competence of university students: A systematic literature review. *Aloma*, 38, 63–74. (2020).
- [12] N.S. Prabhu. Second language pedagogy (Vol. 20). Oxford: Oxford University Press. (1987).
- [13] G. Gómez-García, F. J. Hinojo-Lucena, M. P. Cáceres-Reche, & M. Ramos Navas-Parejo. The contribution of the flipped classroom method to the development of information literacy: A systematic review. *Sustainability*, 12(18), 7273. (2020).
- [14] Ranieri, Maria, & Gaggioli, Cristina, & Kaschny Borges, Martha. La didattica alla prova del Covid-19 in Italia: uno studio sulla Scuola Primaria (pp. 13-17). *Práxis Educativa (Brasil)*, 15. <https://www.redalyc.org/articulo.oa?id=89462860060>. (2020).
- [15] L. K. Michaelsen, M. Sweet, & D. X. Parmelee (Eds.). *Team-Based Learning: Small Group Learning's Next Big Step: New Directions for Teaching and Learning*, Number 116 (Vol. 103). John Wiley & Sons. (2011).
- [16] S. C. Santos, P. A. Tedesco, M. Borba, & M. Brito. Innovative Approaches in Teaching Programming: A Systematic Literature Review. In *Proceedings of the 12th International Conference on Computer Supported Education* (pp. 205-2014). (2020).
- [17] H. Banchi, & R. Bell. The many levels of inquiry. *Science and children*, 46(2), 26. (2008).
- [18] N. Fang. "Student Experiences with Collaborative Problem-Based Learning (CPBL) in a Second-Year Undergraduate Engineering Course". (2018).
- [19] G. Wiggins. *Educative Assessment. Designing Assessments To Inform and Improve Student Performance*. Jossey-Bass Publishers, 350 Sansome Street, San Francisco, CA 94104. (1998).
- [20] O. Zawacki-Richter, A. Bozkurt, U. Alturki, & A. Aldraiweesh. What Research Says About MOOCs – An Explorative Content Analysis. *The International Review of Research in Open and Distributed Learning*, 19(1). (2018).
- [21] N. Yang, P. Ghislandi, & S. Dellantonio. Online collaboration in a large university class supports quality teaching. *Educational Technology Research and Development*, 66(3), 671–691. <https://doi.org/10.1007/s11423-017-9564-8>. (2018).
- [22] L. Darling-Hammond, & J. Snyder. Authentic assessment of teaching in context. *Teaching and teacher education*, 16(5-6), 523-545. (2000).
- [23] P. Limone. Towards a hybrid ecosystem of blended learning within university contexts. In *CEUR Workshop Proc.* (2021).
- [24] J. P. Hewitt. 22 The Social Construction of Self-Esteem. *The Oxford handbook of positive psychology*, 309. (2020).

- [25] J. G. Tullis, & R. L. Goldstone. Why does peer instruction benefit student learning? *Cognitive Research: Principles and Implications*, 5(1), 15. <https://doi.org/10.1186/s41235-020-00218-5>. (2020).
- [26] F. Monya. Scuole chiuse, classi aperte (pp. 19-21). INAPP WP n. 58. <https://oa.inapp.org/handle/123456789/855>. (2021).
- [27] M. E. Abi Raad, H. Odhabi. Hybrid Learning Here to Stay!. *Frontiers in Education Technology*. Vol. 4, No.2, pp. 121-131. (2021).
- [28] P. Limone, & G. A. Toto. Psychological and Emotional Effects of Digital Technology on Children in COVID-19 Pandemic. *Brain Sciences*, 11(9), 1126. (2021).
- [29] M. Ranieri, J. E. Raffaghelli, & I. Bruni. Supporting Learning Design as a Driver for Pedagogical Innovation Within an Integrated Model of Faculty Development. In *Faculty Development for Digital Teaching and Learning* (pp. 77–98). IGI Global. <https://doi.org/10.4018/978-1-5225-8476-6.ch005>. (2019).
- [30] G. A. Toto. Perceptions and effects of distance learning detected during an online course on ICT for aspiring nursery and primary school support teachers. In *teleXbe*. (2021, January).
- [31] G. Afshan, & A. Ahmed. Distance learning is here to stay: Shall we reorganize ourselves for the post-covid-19 world?. *Anaesthesia, Pain & Intensive Care*, 24(5), 487-489. (2020).