

## Blended Learning Model: A Feasible Option for Romanian Undergraduate Education System

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*The accelerating development of new technologies has created a new educational context to which all the education system, including the Romanian one, should try to adapt. Blended learning has become one of the key concepts in the new educational environment. Thus, this paper aims to provide a clearer image of what blended learning means and what are its models, besides what advantages and disadvantages it can bring to the education system. Moreover, this study will focus on whether each model of blended learning can be implemented for each of the stages of the education system. Finally, the study will attempt to establish if any of the blended learning model is suitable for the Romanian undergraduate education system and, moreover, to which stage it should be more appropriate. Overall, this paper contributes to the literature firstly by placing the concept of blended learning in the context of the undergraduate education system and secondly by analyzing the possibility to implement a blended learning system in the Romanian education.*

**Keywords:** Digitalization, Romanian Undergraduate Education, Blended learning model, Digital education, Personalized learning

**DOI:** 10.24818/issn14531305/27.1.2023.02

### 1 Introduction

Industry 4.0 or the fourth Industrial Revolution faced by humankind [1] brought into attention new needs in the labor market [2] and, therefore, an urgent necessity to change the way younger generations are prepared as the future of workforce. The new form of instruction was named Education 4.0 and its key characteristics are customization [3], flexibility and personalization [4]. But any of the objectives of Education 4.0 can be achieved without the assimilation of technology in the educational act [4].

More and more teachers realized the benefits that technology can bring in preparing the children for the new requirements of the labor market and started to introduce different tools either during the teaching process or during evaluation. The COVID-19 pandemic also accelerated the process of integrating technology, the online education being the only feasible alternative for children to receive education since the breakout of the health crisis until June 2021 [5].

Nevertheless, despite the undoubted benefits of an entire online system (either in a format of e-learning or m-learning based solutions) [6], researches have outlined the strong preference towards a hybrid system, both among teachers and students [7]. These studies also support the idea that an online approach could not be sufficient and an educational offer that combines the online and the traditional way could be the best solution for the current situation [8]. For this purpose, the literature started to adopt in the last decades the term of blended learning [9]. Though over time numerous academic researchers proposed definitions for this new terms, at the moment of the publication of this article, there is no univocal way of defining what blended learning is [9], that may lead to confusion and different ways of implementing the concept among teachers all over the world [9]. Nonetheless, numerous implementations of the concept have been adopted by the education system throughout the world, in particular in higher education [10].

Romania is familiar to this concept. The majority of projects that embraced its benefits are implemented in the Romanian Higher Education [11]. Some examples of universities that have already conducted projects in the area of blended learning are the University of Ploiesti, the Faculty of Public Administration from SNSPA or Al. I. Cuza University [11]. The Ministry of Education also made some progress in the sphere of blended learning in the undergraduate education system. A pilot program was adopted in six schools from different counties of Romania during the 2021-2022 school year [12].

Thus, the primary focus of this paper is to attempt to give a clarification of the notion of blended learning, along with its advantages and disadvantages. Moreover, it will provide an overview on the different types of blended learning that the literature presented over the years. It will then continue with a comparison between them. In the end, this study will give an answer to the question whether blended learning could be a viable option for the Romanian undergraduate education system.

## 2 Overview of the term of blended learning

One might think that blended learning is a new concept that arose in the recent years. In fact, the term was firstly used in 1999 [13], so the notion is almost three decades old. Nonetheless, throughout time, numerous interpretations have been given to the term, creating confusion among researchers and specialists [9].

At its first usage, the term merely referred to a combination of any methods and ways of instruction [13]. So, the link between blended learning and technology was not noticeable. One explanation for a so vague definition of the term at that time might be the fact that the worldwide web started to emerge during the '90s [13], so technology was not so widespread as it is these days.

One of the first definitions of blended learning directly linked to technology belongs to Margaret Driscoll. In 2002, she gave four possible options on how one should

understand the new educational concept [14] [9]:

*1. To combine or mix modes of web-based technology (e.g., live virtual classroom, self-paced instruction, collaborative learning, streaming video, audio, and text) to accomplish an educational goal.*

*2. To combine various pedagogical approaches (e.g., constructivism, behaviorism, cognitivism) to produce an optimal learning outcome with or without instructional technology.*

*3. To combine any form of instructional technology (e.g., videotape, CD-ROM, web-based training, film) with face-to-face instructor-led training.*

*4. To mix or combine instructional technology with actual job tasks in order to create a harmonious effect of learning and working."*

This complex definition reinforces the first definition of blended learning, outlining the idea that blended learning is, indeed, a combination of multiple pedagogical theories that can be implemented using different tools, with a more specific focus towards technology integration in the form of CDs or web-based materials. This definition is also supported by Chris Procter, who, in 2003, stated that *"blended learning is the effective combination of different modes of delivery, including e-learning"* [15] [13]. The valuable input of Procter in the field is that he differentiated blended learning from e-learning, making the latter a tool for conducting the former. Another idea Procter sustained is the nonequivalence between blended learning and distance learning, considering that the latter included also a more extensive time and project management so that it could be put into practice [15].

The attempt to clarify the notion of blended learning was continued by Garrison and Kanuka. They provide the following definition: *"the thoughtful integration of classroom face-to-face learning experiences with online learning experiences"* [16] [17]. The interesting aspect of their perspective is the usage of the term "thoughtful", which leads to the idea that not all the combinations between face-to-face and online instruction can automatically be included under the umbrella of blended learning. They admit that

there is not an ideal percentage dedicated to traditional or online activities [16], but the way the two coexist in order to meet the needs of the educational process is essential [16]. This aspect is the one that makes blended learning such a complex concept, with unique implementations [16].

One of the key definitions of blended learning was proposed by Charles R. Graham [13] in 2006. He stated that “*blended learning systems combine face-to-face instruction with computer-mediated instruction*” [18] [13]. It is a rather generic definition, his predecessors narrowing down the concept towards more exact implementations (for instance Procter or Driscoll, who limited the computer instruction to web-based materials). Nonetheless, he reinforces the usage of technology as part of the educational act so that it becomes more effective than the traditional way of learning [19]. One important aspect in the work of Graham related to the blended learning concept is the introduction of the idea that it should be a student-centered learning approach [19].

Chew, Jones and Turner continued the vagueness of Graham’s definition, stating that “*blended learning involves the combination of two fields of concern: education and educational technology*” [20] [9]. The novelty that they brought into attention was the use of the terms “blended learning” and “hybrid learning” interchangeably [20]. This idea is still widespread at the present, many researchers and specialists considering that there is no difference between the two approaches. This is caused by the fact that hybrid learning is widely defined as simply a combination of face-to-face education and online education [17].

In 2010, Allen and Seaman continued the approach of Garrison and Kanuka, by providing the following definition of blended learning: “*Course that blends online and face-to-face delivery. Substantial proportion of the content is delivered online, typically uses online discussions, and typically has a reduced number of face-to-face meetings*”. [21] [17]. Their perspective is noteworthy

because they incline towards a bigger percentage of online activities included in a blended learning approach. They stated that, in order for a system to be considered blended / hybrid, the percentage of online content should be between 30 and 70% [21] [17]. So, according to them, there is indeed a limit that should be considered when categorizing a model as blended learning system.

Garner and Oke brought again into discussion that the education should be student-centered [22] [23]. They define blended learning as “*an instructional environment that intentionally unites the best features of face-to-face (F2F) and online learning venues in a synergistic manner for the purpose of achieving identified student-learning outcomes*”. Therefore, their approach is more oriented towards results, rather than the implementation. They do not embrace a certain distribution between traditional and online activities, but the quality and the output of those activities. Moreover, they also considered the necessity that a blended learning environment should be interactive [22]. Thus, the engagement of the students should be mediated by a variety of online multimedia resources [22].

Even though, throughout time, researchers seemed to have struggled to give a consistent definition of blended learning, there are specific key points one should consider when referring to this notion. Therefore, this study will describe blended learning as a student-centered way of instruction consisting of a combination of face-to-face and online courses, preponderantly online, where the integration of technology is mandatory and where different pedagogical approaches are effectively brought together.

Once a more unambiguous definition of the concept of blended learning has been established, the notion should be further explored. Blended learning, as any in-place or proposed paradigm, is more adequate for certain learning environments. The decision to implement a blended learning system should be certainly based on a clear list of advantages and disadvantages it brings to the educational process.

Blended learning can easily be reduced to the following equation: *blended learning = online (e-learning / m-learning) + face-to-face activities*. So, this educational paradigm will include both the benefits and the drawbacks of each member of the equation [23]. The main advantage of the face-to-face part is the inclusion of the interaction between the instructor and the student [23]. In a complete online approach, the educator can be totally absent and the whole learning process is managed by the learner themselves. Whereas in a blended learning paradigm, there is a shift in teacher's role: they are no more the unique and unquestionable source of information, but rather a mediator between students and learning content [24]. This guidance is properly needed in the learning process in the case of undergraduate students who need to create healthy learning patterns. In addition, teachers will be able to conduct more targeted guidance due to their role as mediators and not content providers [25].

Moreover, blended learning is defined as a student-centered learning approach. Thus, learners' needs should be the core of the process and any educational activity should be developed to be personalized to their learning style. In this way, the learning process becomes more efficient [26] and their motivation would be undoubtedly positively impacted [23]. It also implies flexibility, giving each learner the possibility to create their own learning schedule and conditions [26]. Therefore, another advantage of blended learning seems to be its suitability for different types of learners [13], in this way having a positive impact on students' performance [26] so that everyone could be a top performer in their own time and manner [26].

Blended learning has a beneficial impact on cost reduction as well [23]. Since part of the activities are held online, the content should be multimedia. So, the traditional paperback textbook will soon be replaced by e-books. In this way, the costs of production and distribution of learning materials will be significantly reduced [26]. Moreover, the

process of updating the teaching materials will be eased, so only a few clicks will be necessary to replace the outdated ones [23].

Not only will the teaching experience be improved by the integration of appropriate tools, but also the evaluation process. Actually, the whole evaluation can be replaced by an online one, where feedback is provided instantaneously once the tests are graded automatically [26]. Tools can be used for tracking learners' progress, so a clearer image of how each student performs during a specific period of time can be provided to all stakeholders of the educational process (teachers, students, parents) [26]. Moreover, transparency will be encouraged, since all parties will have the same level of access to all assessments.

One last advantage of blended learning consists in students' automatic training for a "digital natives" age [26]. Integrating more and more technology in the educational act, constantly updating the teaching materials so that learners' skills will be developed in accordance with the labor market is an enormous benefit of this new approach in the new rapidly evolving area.

Nonetheless, blended learning comes with a series of disadvantages. First and foremost, proper guidance in order to correctly implement and use a blended learning solution is required. In this case, two variables should be considered: the level of digital literacy of both teachers and students [26]. The level of experience in using digital solutions among Romanian teachers has been proven during the pandemic at a lower level than expected [27]. Therefore, the problem might be deepened if the level of teachers' digital skills is not rapidly solved in the Romanian education system.

Secondly, in a blended learning environment, the whole learning process strongly relies on technical resources [26]. Thus, each student and teacher should benefit from high-performance equipment in order to either prepare the lesson or to participate to it. Studies have shown that this requirement is difficult to be met especially by students [23].

They can come from different social backgrounds, some of them being part of disadvantaged communities, so the material effort can never be sustained without help from government. Romania is one of the countries in which the lack of technical resources among children can indeed block the implementation of a blended learning environment because of the rate of children that live in disadvantaged communities [27].

### 3 Research Methodology

This study focuses on an analysis of the different types of blended learning systems. After a better understanding of the characteristics of each type, a further decision could be made whether any of them is feasible in the Romanian educational environment. This paper has two main parts. The first part covers an overview of the most discussed types of blended learning. The second one provides a comparison between each of them. Moreover, each type of blended learning will be analyzed in relation with each of the stages of the Romanian Undergraduate education system (kindergarten, primary school, secondary school, high school).

The theoretical approach of this study is justified by the fact that one firstly needs to understand from a conceptual point of view each notion in order to decide an implementation for it. In the case of blended learning, a similar study is even more mandatory since the notion is not uniformly defined. Moreover, in the Romanian space, the introduction of technology, even though started after the fall of communism [27], is still timid and viewed with reluctance [27]. By using this method, the Romanian education can gain awareness on different solutions and make an informed decision for the most suitable approach. This study starts with an overview on each type of blended learning as presented in the literature. Then, the paper will discuss, based on the advantages and disadvantages of each, if there is any viable way to make the Romanian Undergraduate education system benefit from this educational paradigm.

## 4 Findings

The researches have shown, throughout time, a particular interest in categorizing the different approaches of blended learning. The following section will provide an insight on the most important types identified in the literature. Then, based on their characteristics, a comparison will be made in order to outline the most appropriate approach for an undergraduate system.

### 4.1 Types of blended learning

Among the first researches who has tried to provide a topology is Purmina Valiathan [13]. He suggested three types of blended learning models based on the aspect they trigger: the skills, the attitude or the competency [13]. These types seem self-explanatory, but a short definition for each is still required for the better purpose of this study. The skill-driven model represents the model that was designed with the goal of enriching a new skill [13]. The attitude-driven model is more oriented towards the acquisition of new behaviors [13], whereas the competency-driven one allows learners to learn via example, by observing experts [13]. Nevertheless, this topology was not adopted due to the fact that it was considered that there was not a clear difference between whether each type was based on a pedagogical method or a learning objective [13].

The most influential approach in terms of topology of blended learning models was proposed by Staker and Horn [13] [17]. Even though their original classification consisted in six types [13], they reduced the model to only four [13]: rotation model, flex model, self-blend model and enriched virtual model [13]. Furthermore, the rotation model was divided in several sub-categories: station rotation mode, lab-rotation model, individual-rotation model and, the most known [28], flipped classroom [23].

Rotation model, as its name already suggests, implies an adjustment to the original schedule [25], based on the activity the learners need to do. The instructor will moderate the rotations within the study group [23]. Among the

learning modalities, students can benefit from online learning [17], group activities [25], individual tasks by a computer [25] or full-class instruction [17]. Each sub-model of the rotation model was built in order to respect this basic principle. In the case of station-rotation model, the rotation is done within the same classroom, but students move around the stations [23]. In this context, the term “station” does not solely refer to a computer, but can also be understood as a type of offline activity (for instance, students need to collaborate within a new group in order to finish a particular task) [23].

Lab-rotation model also implies movement, but, in this case, the criteria is whether the school provides a dedicated classroom adequate solely for online activities [23]. In other words, the alternation of this model is between regular classrooms and classroom built specifically for e-learning purposes [23]. Individual-rotation model is, par excellence, the prototype of a student-centered learning approach. It implies a rotation of the student because of their needs [23]. Therefore, they rotate in order to choose the best learning activity (whether in the paradigm of traditional learning or as part of the online instruction) that will help them enrich their knowledge and reach their potential.

Flipped classroom is the most known approach of blended learning probably because it simply represents a rotation between online activities and traditional face-to-face learning [23]. Thus, some content should be gone through by students at home, at their own pace, in their own space and time and some activities require presence on campus. In the case of flipped classroom, online learning is equivalent to online instruction, so some of the teaching activity and content delivery are shifted from on campus activities to online ones [23]. In this way, students can fully benefit from the e-learning / m-learning experience incorporated in blended learning.

Another blended learning model is represented by the flex model. Whereas in the rotation model, there seems to be a proper

balance between the online activities and face-to-face instruction, this approach is a more oriented towards the online paradigm [17]. The students learn and practice on their own [23]. In this case, the teacher is, indeed, only a mediator, only an instruction that provides limited guidance within the learning process [23]. Teachers’ support is usually provided via offline activities, such as individual training or small group discussions [17].

Self-blend model was designed especially for students who want to enrich their knowledge by taking additional classes [23]. Therefore, the core of this model remains the face-to-face instruction, but, in addition, online supplementary classes are provided to students [23]. This model also highlights the idea of a student-centered approach since the learner is the one who chooses which supplementary courses they should attend, according to their needs.

The last model, according to the topology of Staker and Horn is enriched virtual model. Another designation is remote blended learning [28]. This model evolved into a blended approach from a complete online course in which students need face-to-face learning [23]. Thus, the enriched virtual model is a combination of on-campus learning and remote learning [23]. The students who need face-to-face instruction begin with this kind of activity. Once it is finished, they individually continue remotely the remaining subjects that were not covered by the teacher [23].

Apart from the topology presented by Stalker and Horn, the literature also presents other models of blended learning that have been tested throughout the years. Yet, they are not so widespread, but they came as a response to certain educational needs. Some examples are project-based blended learning, self-directed blended learning, blended learning inside-out or outside-in blended learning, [28]. The project-based model is self-explanatory. It refers to a blended system (so a combination of online and offline resources) that the student uses to gain expertise in relation to a certain project or product [28].

Self-directed blended learning can undoubtedly be considered a student-oriented approach par excellence. It represents a model in which the learning activity (both online and offline) is designed so that the student can achieve a set of learning goals [28]. In this scenario, the learning experience is unique for each student and the level of guidance the teacher should provide is based on student's needs, if the student requires guidance at all [28]. Thus, the teacher has no longer a traditional role, but their role as a mediator, as a guide of the learning process is accentuated [28]. In this model, their only role is the one of a provider of adequate activities so that each student will achieve their personal learning goals [28].

Inside-Out and Outside-In models have a common characteristic: the integration of a non-academic physical activity that takes place outside the classroom in the learning process [28]. The sole difference between the two is the moment when this activity is integrated: in the inside-out model, the activity is towards or at the end whereas in the outside-in approach, the learning process starts with this non-academic activity [28]. There are several advantages to this approach. Firstly, the learning environment is not reduced to a simple classroom [28]. Secondly, it encourages collaboration, communication and development of additional skills [28].

The models presented so far will undoubtedly not be the only acceptable models. Blended learning will evolve and, based on students' needs in order to achieve fixed learning goals, new models will be discussed in the literature [28]. Nevertheless, the levels of implementation will still be the ones Graham topologized: course level, training program level, training program level and institutional level [25]. Based on this categorization, one can introduce any of the blended learning models (already validated by the literature or a brand new one) at different levels. Activity level is the most basic level, in which a

combination between online and offline activities are combined during a particular learning task [25]. Course level implies introduction of specific online activities during a certain moment at a certain subject [25]. In the case of training program level, the training as a whole is considered and the blended learning activities can be integrated both at the beginning or at the end of the training [25]. Institutional level is the most complex because it implies building or rebuilding the whole curriculum for a certain period (a year or a semester) for all subjects so that it molds to the blended learning paradigm [25].

#### **4.2 Blended learning models and Romanian Undergraduate Education system**

According to Law no.1/2011 [29], which is the law that regulates the national education in Romania at the moment of writing this article, the Undergraduate Education system is composed of kindergarten, primary school, secondary school and high school. It begins at the age of three, the minimum age a child must be in order to be integrated in kindergarten [29]. Thus, since the ages of the target group is so vast, there is no unitary model of blended learning that can satisfy the needs of all pupils. The purpose of this section is to provide an overview on whether the most known models of blended learning can be applicable to a certain stage of the educational process. The topology of Staker and Horn will be the base of this overview, to which other four models will be added.

Table 1 provides a possible distribution of the possibility of integration for each model to each stage of the education system. The decision was based on the previously-mention characteristics of each model in relation with the age of each target group. The age is an important factor to be taken into consideration since students' learning independence is correlated to it.

**Table 1.** Blended learning models in Romanian Undergraduate Education System

	Station rotation model	Lab rotation model	Individual rotation model	Flipped classroom	Self-blend	Flex model	Enriched virtual model	Project-based model	Self-direct	Inside-out	Outside-in
Kindergarten (3-6 years)	v	x	v	x	x	x	x	x	v	v	v
Primary school (6-10 years)	v	v	v	v	v	x	v	v	v	v	v
Secondary school (10-14 years)	v	v	v	v	v	x	v	v	v	v	v
High school (14-18 years)	v	v	v	v	v	v	v	v	v	v	v

According to Table 1, it seems that the high school stage can benefit from all the models of blended learning, whereas the students in kindergarten can benefit only from five out of eleven presented models. There are also some models that can be implemented independent of the stage. In this category, we can include station rotation model, individual rotation model, self-direct, inside-out and outside-in models. Next section will go into details and further explain the reasons why certain models can be used only in the case of a particular group of learners.

Nevertheless, one might take into consideration also the level to which the online activities can be implemented: activity, course, training or institutional level. Due to the strict curriculum in the Romanian education system, as well as the discrepancy between the way different schools are equipped, a uniformization of approaches are not feasible. Based on the current situation of the undergraduate education system, an institutional level seems not to be a solution. Therefore, in the next section, the whole analysis implies a integration either at activity level or at course level, being considered the only two feasible modalities at the moment.

## 5 Discussions

Introducing blended learning can represent a revolution in the Romanian undergraduate education system. Nevertheless, the way in which this concept is implemented is crucial. Thus, this section will iterate through each of the eleven blended learning models presented in the previous section and will attempt to provide explanations about the choices of possibility of implementation captured in Table 1.

The first model, that suits all levels of the system, is the station model. The nature of this type of rotation makes it adequate for all students, regardless their age. In this model, students will rotate, so they will participate, to a dedicated task, either online or offline, based on their needs. The teacher will have the role of the instructor, so their challenges will be to create enough activities and a plausible rotation schedule. The station rotation model may seem more difficult, but still feasible to be implemented in the case of kindergarten children due to the nature of the activities. In the case of online activities, children will be dependent on an adult to perform the task and cannot complete it on their own. This will lead to difficulties regarding class management if there will be only one teacher and a considerable number of pupils involved in an online activity. Unfortunately, this is a very



possible scenario in the Romanian education system since the number of students in a class is around 25.

The main characteristic about lab-rotation model implies dedicated rooms that should be used for certain activities, especially online ones. Because of this aspect, this model is not feasible for kindergarten: the nature of their activities is more oriented towards gaining more general knowledge, whereas this model seems to be more appropriate for situations where particular knowledge should be explored. Moreover, there will be very difficult to operate with large groups of children. Nonetheless, this type of rotation should be mandatory for primary, secondary and high school with a more accent towards science classes (biology, chemistry, physics, computer science). In this way, online activities can offer students a deeper understanding of some concepts. For example, this kind of approach can be used in a biology class with the aid of VR or AR to explain different processes that take place within the human body. In this way, there is a shift from a theoretical approach (the traditional one in which the teacher only tells a story) to a more applicable one.

Individual rotation can, in theory, be implemented at all stages since pupils can benefit from a totally student-centered approach at any age. Nevertheless, the reality of the Romanian undergraduate education system at the moment poses some challenges. Firstly, each class, no matter the level, has a great number of students (around 25) allocated to only one teacher. In this way, since every pupil has their own needs, their own pace to assimilate the information, the teacher might fail to adopt a student-centered approach. Secondly, there is a strict curriculum that needs to be followed. Not only does this model not encourage a student-centered learning path, but it actually promotes a uniform one, in which, each student gains the same knowledge at the same level regardless each child's talents, ambitions and interests.

Flipped classes can be implemented to all stages except kindergarten. The main reason is the age of the target learning group. Between the ages of three and five years, the learners are at the beginning of their learning. As a consequence, they need permanent guidance provided by the teacher or instructor since they are not independent learners. As flipped classes imply some learning activities at home, in the case of kindergarten children, parents should be more involved in the educational act and assume the role of the instructor during the learning time children spend at home. This can bring a lot of challenges due to the fact that most of the parents do not have expertise in being an instructor for a learning process.

Another model that is not adequate for kindergarten, but can be implemented to all others levels, is self-blend model. The learners' age is, again, the main reason. They are just starting their learning process, so their main focus is on developing practical skills (such as cutting, gluing, drawing, writing). So, there are not so many particular skills that children should feel the need to enrich through additional online courses. The same reasoning can be applied to the little amount of theoretical knowledge they acquire at this age. They only discover the world around them and satisfy their curiosity, sometimes by learning activities. Thus, their environment should be far from the strict and formal one the school implies.

Flex model, by its direction to seem more oriented towards the online paradigm, appears not to be, one more time, suitable for kindergarten. Kindergarten children are dependent on their teacher / instructor since their learning experience is limited or inexistent. Moreover, they cannot access on their own different online materials. Thus, for this stage, the role of the teacher as providing only limited guidance may not be appropriate. On the contrary, the teacher needs to provide intense guidance both for knowledge gaining and for adopting learning patterns. This reasoning can be extended also to primary and secondary school since they do not master yet

the art of knowing how to learn. The only level this approach can be suitable is high school because by that time, students should have become independent learners. They know, until a certain extent, what suits them in terms of learning schedule. They also already have some learning preferences, some techniques that help them during the learning process. Thus, they can indeed guide their own learning and the teacher can embrace their role as a mediator and a simple mentor that provides limited guidance.

One more time, enriched virtual model is suitable for all ages excluding kindergarten teacher. The reasoning is the same, their age makes them dependent learners, so they cannot conduct their own learning process. Nevertheless, when it comes to primary, secondary and high school, a similar model can undoubtedly be implemented, but on one condition. The way the learning process is designed should incorporate firstly the face-to-face activities, to build a foundation. Once the foundation is stable, the process can start to include also remote activities that the students can do on their own. These activities should be thoroughly explained and enough guidance should be provided for them, especially in the case of primary school children.

Project-based model is another model that should be more appropriate for primary, secondary and high school rather than for kindergarten. It seems to be more oriented towards more practical subjects (such as chemistry, biology, natural science) in order to provide specific knowledge to the learners. This is the direction that should be embraced at more advanced stages in the learning process. Whereas at kindergarten, the purpose is that the learners gain general knowledge and develop minimal skills in order to discover the world. Project-based model is not proper for building a foundation, but to expand that foundation towards a specialization.

Self-direct model is, as well as inside-out and outside-in models, suitable for all ages. The self-direct one is based, once more, on a

student-centered approach, so discovering the needs of each learner is a mandatory task for the teacher. In comparison with other student-centered models, this can be a solution for all stages due to the fact that the role of the teacher is not reduced to an instructor. This model just focuses on identifying each learner's needs and adapt the educational process accordingly. This direction can undoubtedly be embraced also in the case of little children, but with the condition that the teacher is always by their side to provide support. The only major challenge that this model needs to face is the number of students a single teacher is responsible for.

Inside-out and outside-in models appears to be a perfect choice for the undergraduate education system. By starting or ending with a certain different activity, that usually takes place outside the classroom can surely increase learners' motivation and curiosity for the topic. Moreover, it encourages the gamification of the learning process, that might be extremely helpful especially for little learners who do not always need a strict and formal learning environment.

## 6 Conclusions

The new era dominated by technology has left its mark on the education system as well. Though both students and teachers are still reluctant towards a fully online education system [7], a combination between the traditional face-to-face approach and online activities is embraced. As a consequence, the notion of blended learning started to gain popularity.

This paper firstly offered to its readers a comprehensive image of how of the notion of blended learning has been understood throughout the years. Though started to emerge almost thirty years ago [13], this concept is not uniformly defined among researches [9]. So, the need for a comprehensive definition was covered in the first part of this study, in addition to its advantages and disadvantages.

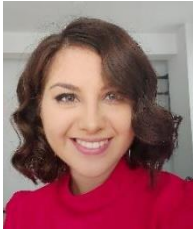
Secondly, the focus of this research shifted to presenting an overview of the different

typologies that categorize the blended learning models, especially the one proposed by Staker and Horn [13] [17]. Then, an exhaustive analysis on whether the models can successfully be integrated in the Romanian undergraduate education system has been provided. The models that were considered were rotation model (with all its four sub-types), flex model, self-blend model, enriched virtual model, project-based model, self-direct, inside-out and outside-in model. The choice to include only these models was based on their popularity among researchers. This paper confirms that integrating some of the blended learning models in the Romanian undergraduate education system is not only feasible, but also beneficial. It outlined the need to consider the age of the learners since some models are suitable for all ages whereas others can be implemented once the learners are more independent. This can be a valuable contribution to the literature, providing future directions that can be used at kindergarten, primary, secondary and high school so that pupils can benefit from the rapid evolution of the technology to improve their learning experience.

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