

# Use of ICT for flexible and hybrid university teaching: a blended learning model for face-to-face and online learning

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## **Abstract**

The purpose of this study is to explain how the use of Information and Communication Technologies is a fundamental support for Teaching Innovation, promoting processes of transformation and continuous improvement in the teaching environment. The experience described has been carried out within the subject "Fundamentals of Business Organization and Management", which is taught in the first year of the Degree in Telecommunication Technologies and Services Engineering at the Polytechnic University of Valencia. The use of ICT has facilitated the design and implementation of complex tasks and the formative evaluation of an Outcome-Based Education Model. As well, the application of a hybrid learning model (blended learning) that, by combining face-to-face and online teaching synchronous, has allowed a quick adaptation to an environment that requires immediate changes from online to face-to-face teaching and vice-versa, with a diversified methodological design that enables an effective learning environment that stimulates interaction and collaboration among students.

**Keywords:** Blended Learning Model, IS Methodologies and Education, Teaching Innovation, Instructional Design, Creativity and Innovation in IS Educational Development.

## **1. Introduction**

Universities have to prepare future professionals to work in an increasingly complex scenario, with ever-changing market dynamics and social expectations, and with growing demands when it comes to being hired. In this context, the Outcome-Based Education (OBE) model is a way to respond to these personal, social, professional and cultural needs. teaching faces a high level of uncertainty due to health crisis, constant evolution of technologies and unforeseen changes [11].

The Bologna Declaration set in motion a transcendental process of educational transformation that imposed on the universities of the European Higher Education Area the obligation to orient higher education towards the acquisition of competencies. To align with this objective, Spanish universities have made structural and methodological changes to move from the traditional model based on teaching to the new model based on learning and acquisition of competencies [13]. However, at the classroom environment, this change is a great challenge for teachers. Many of the pioneers of its implementation struggle daily to make sense of what OBE should be, and to design teaching activities that truly serve this purpose [10].

Currently, the application of ICT in the training environment is considered as an enhancer of active learning for all levels and abilities [4], being susceptible of "becoming a driver of change and innovation" [8].

This article describes a project framed in a Teaching Innovation and Improvement Project (PIME) of the Universitat Politècnica de València (UPV). Specifically, within the subject "Fundamentals of Business Organization and Management", which is taught in the first year of the Degree of Technologies and Services Engineering at the School of Telecommunications Engineers. This project involved the participation of 183 students. It explains how the use of ICT has facilitated both the application of a OBE model in the Laboratory Practices (PL)<sup>1</sup> of this subject, and the adoption of a blended learning (BL) methodology.

This combination has been particularly relevant in the current situation, in which the volatile, uncertain, complex, changing and ambiguous environment in which university teaching takes place, exacerbated by the COVID 19 pandemic, requires teachers to rapidly adapt their practical teaching activities, the materials to be used, the methodologies employed and even their evaluation procedures [19].

The motivation for carrying out the project was threefold: on the one hand, to contribute to the improvement of the learning process of our students; on the other hand, to contribute to the creation of experience and knowledge in the application of the Outcome-Based Education model and in the adoption of the blended learning methodology; and finally, that these were scalable to other subjects, in different schools and at different levels of training.

The project is framed within the action lines of the use of ICTs for quality learning and training scenarios for active and constructive learning and has been conceived with the purpose of facilitating the approach of the students to the business world by developing: i) their entrepreneurial skills, ii) their strategic thinking, iii) their knowledge of contemporary problems, and iv) their critical spirit and analytical skills.

The Teaching Innovation and Improvement Project has been designed for a duration of two academic years. The first course consisted of a kind of proof of concept in which the focus of the activities was on: i) the methodological design of the CPs, according to the Competency-Based Training model (learning objectives, complex tasks, subtasks, materials to be delivered to students, evaluation criteria and instruments, etc); and ii) designing and preparing the virtual space with the necessary technological resources to carry out the methodological design in a hybrid teaching format.

This article presents the results obtained in the first year of the project. For the second year, it is planned to implement the lessons learned in the first year, as well as methods and instruments of inquiry to obtain evidence of the degree of student satisfaction with the teaching innovation implemented, as well as the extent to which it has contributed to improving their learning process.

The remainder of this paper is organized as follows. Section 2 describes the teaching innovation and improvement project. Section 3 describes the methodology used. Section 4 presents the results obtained and their analysis. Finally, the last section presents the conclusions, limitations and recommendations for future work.

## 2. Purpose

The aim of this article is to explain how the use of ICT has facilitated the development of a teaching innovation, specifically, the application of OBE in the subject Fundamentals of Business Organization and Management of the first year of the Degree in Telecommunication Technologies and Services Engineering, combined with the application of a blended learning (BL) methodology.

Specifically, throughout the article we try to answer these questions:

- 1) Do ICTs facilitate the rapid adaptation of teaching to changing environments?
- 2) Do they facilitate the design of complex tasks and formative assessment tools required by an OBE methodology?
- 3) Do they facilitate virtual spaces that allow the autonomy, flexibility and interaction

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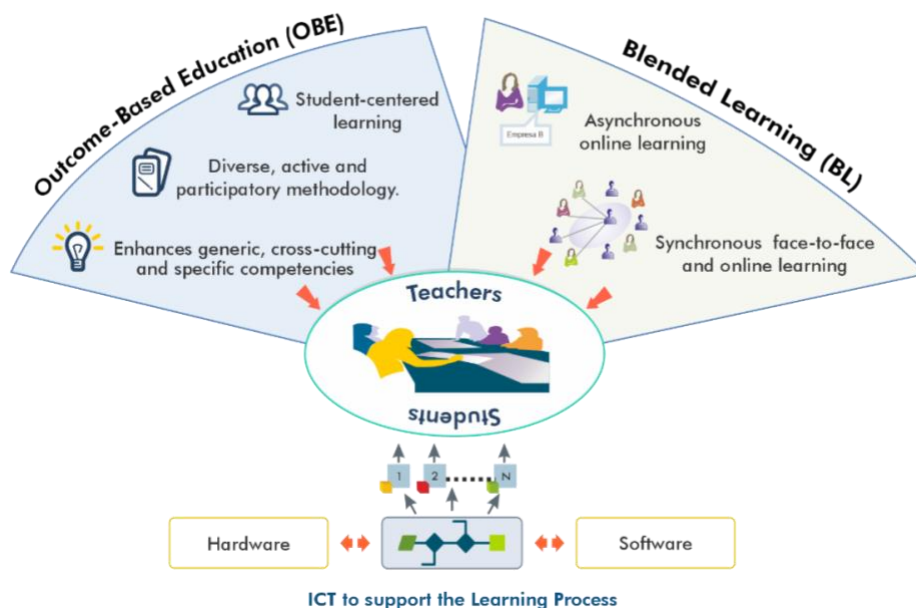
<sup>1</sup> Although it is a subject of the Department of Business Organization, whose objective is the development of a business idea, the name of PL, common to all the degrees of the School of Telecommunications Engineering, is maintained.

- required for the development of a competency-based learning process?
- 4) Do they make it easier to respond to the 4 key challenges of blended learning environments: incorporating flexibility, stimulating interaction, facilitating the learning process of students and promoting an effective learning environment [2]?
  - 5) Do they contribute to the improvement learning outcomes for students?

### 3. Methodology

#### 3.1. Methodological approach

For the development of the teaching innovation, a combination of the OBE model and the BL methodology supported by ICT has been applied. Figure 1 below describes this combination.



**Fig. 1.** Teaching innovation supported by ICTs

(Source: own elaboration, based on Seaton, C. and Catalá, I.)

The lower part of the figure represents the ICTs that support the EBO model and the BL methodology. At the hardware level, the school's computer and multimedia equipment are included, as well as that of the students and teachers (computers, laptops, Tablets, smartphones, webcams, microphones, headphones, etc.). At the software level, we include the e-learning platform (PoliformaT) with applications such as Lessons, Rubrics, Tasks, etc.. and the Teams environment provided by the UPV; and the various apps that teachers select and apply on their own depending on the activity to be developed: kahoot, socrative, audacity, camtasia, miro, canvas, gennially, etc... All of them have made it possible to carry out the activities described in Table 2.

In the center of the figure, the teachers and students are interacting with each other to carry out the activities designed to achieve the outcome of the PL. The upper left of the figure depicts the EBO model that guided the design of the complex tasks, assessment criteria and instruments, and expected outcomes. The comparison of this model with the traditional approach to knowledge transmission presented in Table 1 will help to understand the major transformation it represents in the teaching-learning process [11, 12].

**Table 1:** Comparison between traditional approach and EBO (source: Martínez Clares & Echeverría Samanes, 2009)

Traditional Training	Outcome-based education
Disconnected from the reality of the environment	Attentive to the changing needs of society and their professionals.

Teaching-centered approach.	Approach focused on learning and knowledge management.
Information transfer is a priority.	Importance of integral and permanent training.
Lack of awareness of students' interests and the need to enhance their skills and abilities.	It is based on the need to strengthen the generic, transversal and specific competencies of the target groups.
Compartmentalized and inflexible curriculum.	Integrated and flexible curriculum.
Master class as a unique methodology.	Diverse, active and participatory methodology.
The student is a passive recipient of information.	The student is agent of his own learning.
Use of written text as a priority.	Focused on alternative forms of work.

The upper right part of the figure describes the BL methodology that, as shown by Boelens et al. (2017) [2], has addressed the four key challenges posed by the need to combine synchronous and asynchronous face-to-face and online teaching and migrate from one modality to the other depending on the evolution of the pandemic: providing the necessary flexibility to students and teachers required to adapt to the changing environment; facilitating, at the same time, the learning processes; stimulating student interaction; and fostering an effective learning environment [2].

The term "blended learning" has two types of definitions frequently cited in the literature [9]. Graham (2006) [7] defines blended learning as follows "blended learning systems combine face-to-face instruction with computer-mediated instruction". Garrison and Kanuka (2004) [5] define blended learning "as the thoughtful integration of classroom face-to-face learning experiences with online learning experiences". In the context of this project, the added complexity has been to combine the two teaching modalities, face-to-face and synchronous on-line, at the same time. That is to say, students participating in the same class were simultaneously face-to-face and online, thus allowing the participation in the class of the confined students, and the immediate migration of the whole class to online or face-to-face mode, depending on the evolution of the pandemic. This fact allowed, thanks to the functionalities provided by ICT, a very high degree of flexibility, and the overcoming of an unprecedented complexity.

### 3.2. Specific methodological design

The training format consisted of 3 face-to-face sessions of 2 hours spaced in time throughout the four-month period, see table 2, where the sequences and their contents and goals to be achieved, the means of evaluation and the expected product with the weight of each item are described.

In addition to classroom attendance, which could be online or face-to-face, individual work was required prior to each practical activity outside the classroom and subsequent group work leading to the public presentation of a final paper.

Table 2 below describes the sequences of the 3 practical sessions, the objectives and their content and targets to be achieved, the means of evaluation and the expected product with the weight of each item.

**Table 2:** Development of practical activities (source: the authors)

Session	Goals	Subtasks	Evaluation methods	%
			Expected products	Weight
1 <sup>a</sup>	1. Identify the key elements and concepts that characterize a Smart City. 2. Propose a business idea that solves a social problem through the use of ICT and is implemented in the framework of a Smart City - COVID - digitalization. 3. Identify the key elements and concepts of the Osterwalder Business Model.	<b>Online and asynchronous</b> 1) Reading what a Smart City is and watch a video. 2) Watch Business Model video and/or read Business Model text. 3) Answer questions in Lessons about Smart City and Business Model. 4) Form groups based on the virtual roundtables. 5) Identify business idea through a collaborative tool.  The completion of these subtasks' conditions for the completion of the next one.	1) Short questions or multiple-choice questions.  2) Description of: a) The group process of ideation and formulation of the business idea. b) The business idea resulting from this process, describing its characteristics and the problem it solves.	30%

	4. Generate the Business Model (Canvas) of the product or service that has been devised.	<b>Presential / on-line and synchronous</b> 1) Analyze the business idea and determine the 9 elements that make up the business model of the idea. 2) Compile these elements in the Osterwalder Canvas. 3) To elaborate a report that includes the Canvas created for the business idea, explains in greater detail each element of the Canvas, and exposes the reflections and conclusions from the work done.	Written report including: 1) the Canvas developed for the business idea. 2) a more detailed explanation of each element of the Canvas. 3) Reflections / Conclusions based on the work done.	70 %
2 <sup>a</sup>	Identify the key elements and concepts that characterize: PESTEL Analysis, Market Analysis: Porter's 5 Forces and SWOT.  Apply the concepts studied about PESTEL Analysis, Market Analysis: Porter's 5 Forces and SWOT to the business idea proposed.	<b>Online</b> 1) Watch videos, PESTEL Analysis, Porter's 5 Forces and SWOT and read a text provided by us or search the Internet. 2) Answer questions in Lessons on PESTEL Analysis, Porter's 5 Forces and SWOT.	1) Short questions or multiple-choice questions.	20%
		<b>Face-to-face / online</b> 1) Perform the PESTEL Analysis, Market Analysis: Porter's 5 Forces and SWOT of the proposed business idea. 2) Update the business model based on the results of the analyses performed.	1) Written report compiling the results of the PESTEL, Porter's 5 Forces and SWOT analyses performed. 2) Written report compiling the modifications made by the update of the Business Model elaborated in task 1.	80%
3 <sup>a</sup>	Compile and communicate the results of the work performed in previous tasks 1 and 2.	<b>Face-to-face and/or online</b> 1) Generate a 3' video that defends the value proposition of the business idea. 2) Deliver the video through Learning Management System (LMS) "PoliformaT" assignments. 1) Generate a written report that compiles the results of the work done in tasks 1 and 2; and exposes the reflections and conclusions of the work done. 2) Deliver the report through PoliformaT tasks. <b>Face-to-face and/or online</b> 1) View the video. 2) Present orally, by all the members of each team, the results of tasks 1 and 2, as well as the reflections and main learnings derived from the experience.	Video published and viewed in classroom/online classrooms.  Written report compiling the results of tasks 1 and 2.  1) Oral Presentation. 2) Audiovisual support for the oral presentation.	10%  60%  30%

Table 2 shows all the activities designed for students to develop the generic, transversal and specific competencies implied by the learning objectives of the PL. The use of the technological tools described in Figure 2 has facilitated both the design and implementation of the activities and their collaborative realization in a face-to-face and on-line manner in synchronous and asynchronous mode, thus contributing to the effectiveness of the learning process.

Figure 2 describes in detail how ICTs made it possible to solve the challenges posed and provide the required flexibility in each complex task.

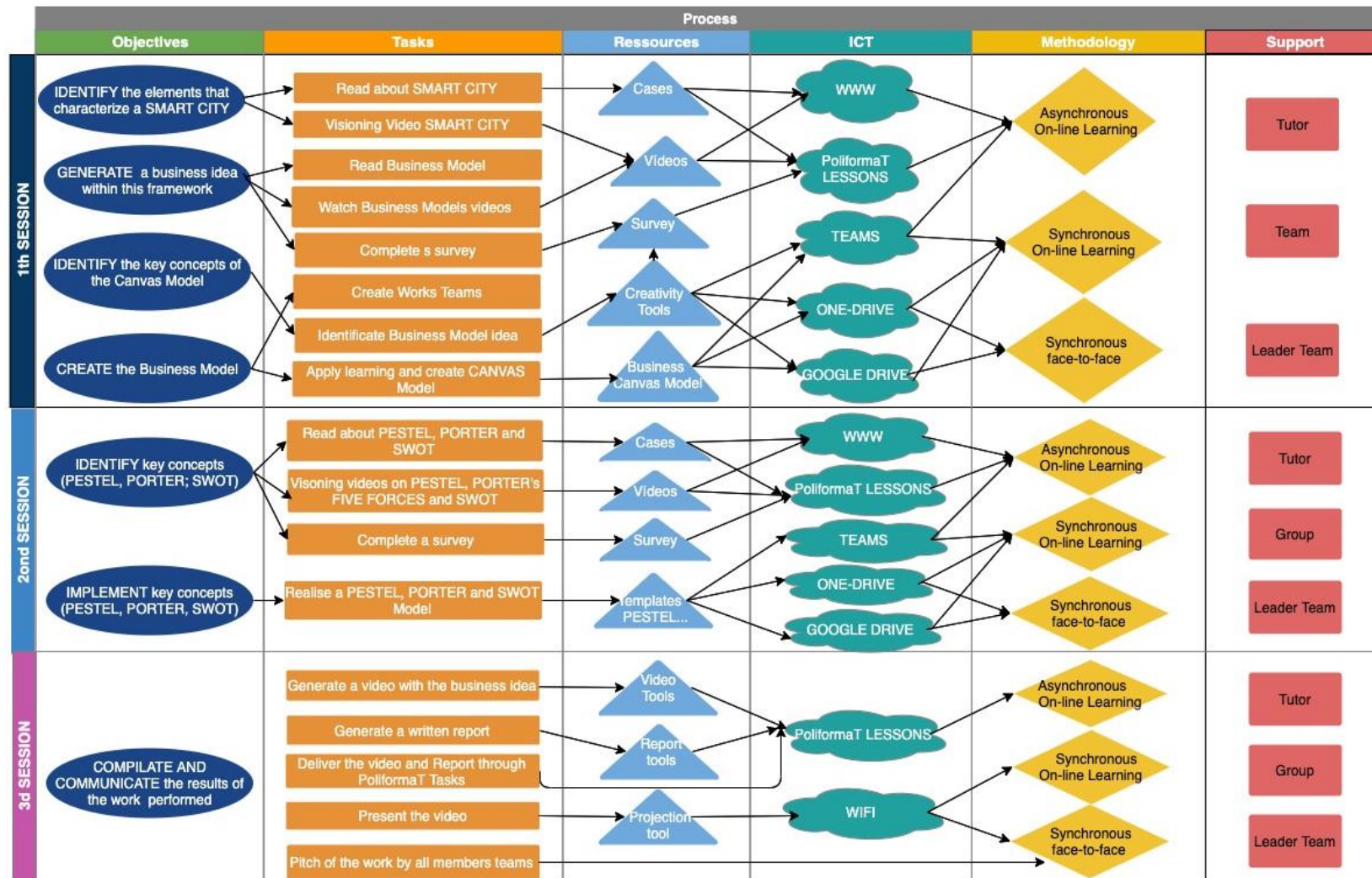


Fig. 2: Methodological development of the PL (source: the authors)



As shown in the figure, the first part sets out the objectives of the three sessions and the tasks that the students had to perform to achieve them. In front of each task, it is explained what resources were needed. By necessary resources we mean all kinds of tools, templates, documents or cases, surveys and videos that will support the completion of the task. The following column lists the ICT used. In the case of this experience, they have been as diverse as the network, the LMS platform (PoliformaT), Teams and OneDrive of Microsoft, Google Drive, among others. The information is complemented with the blended learning methodologies used and finalized with the support provided by the tutor teacher, the group or the group leader

#### 4. Results and analysis

The results obtained from the implementation of the project showed that ICTs greatly facilitate the design and implementation of teaching innovations based on the competency-based training model combined with hybrid teaching. In the following sections we will try to answer the questions posed as the objective of this article:

##### 4.1. Do ICTs facilitate the rapid adaptation of teaching to changing environments?

The use of ICT made possible the combination of synchronous on-line learning and synchronous face-to-face. Thus allowing, on the one hand, to migrate from synchronous face-to-face to synchronous on-line learning, and vice versa, when the outbreak of the pandemic demanded it without the need for methodological changes, since the teaching design contemplated it. On the other hand, it made it easier for confined students to follow from home the classes that were held in person and to carry out the group activities that were proposed through the Teams platform.

Figure 3 shows a situation during the practical classes. The teacher had to teach synchronous classroom classes in a face-to-face manner to students present and to students confined at home through Teams.

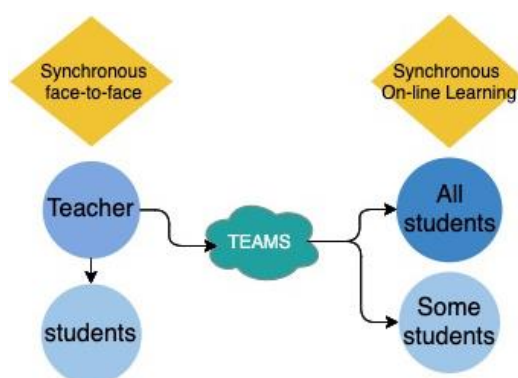


Fig. 3: Hybrid classroom delivery case (source: the authors)

Figure 4 shows the reverse situation in which the teacher, due to a confinement, also taught from an electronic device to a part of the students physically present in class and another part on-line from another location.

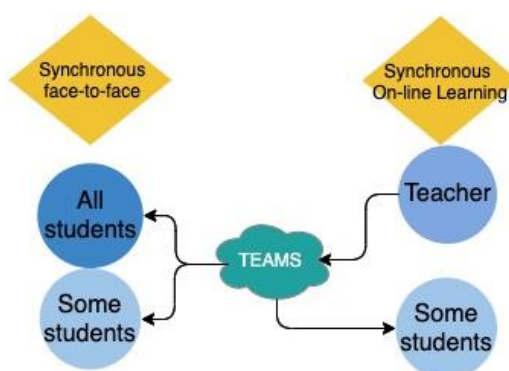


Fig. 4: Hybrid classroom delivery case (source: the authors)

Experience has shown that at the methodological level, blended learning offers many advantages for both teachers and students. However, problems have been observed at the level of technological equipment. A clear example is the insufficient quality of audio and video that has prevented the students who follow the classes from seeing the blackboard well, hearing the teacher if he/she moves around the classroom and interacting with the rest of the students. Teachers also suffer from problems such as the impossibility of attending to students in the classroom and those at home at the same time, having to interrupt the rhythm constantly.

**4.2. Do they facilitate the design of complex tasks and formative evaluation instruments required by an OBE methodology?**

The use of ICT has made it possible to carry out and implement the methodological design proposed in point 3.2. Specifically, the activities carried out have been:

**a) Access to Lessons (reading activity registered in the e-learning platform)**

The data in Table 3 reflects student access to the platform. No data are available on the time spent online each time they logged on and, therefore, on the time spent watching videos and reading texts.

Table 3: Reading activity registered in the e-learning platform (source: platform PoliformaT)

Nº of students who have accessed Lessons	Range of number of days accessing content	Number of times they have accessed the contents	Average number of times the content has been accessed / student
108	Between 1 and 23 days	Between 4 and 180 times	65 times

**b) Viewing of videos and self-assessment with multi-answer control question in Lessons Tool**

The response data to the video viewing control questions are low, see table 4. Of the 108 students who logged on, 39.8% and 31.5% answered the 2 control questions. However, 100% of the students' answers are correct, which indicates that they have learned the concepts that were considered relevant prior to the internship.

Table 4: Activity of the tasks registered in the e-learning platform (source: platform PoliformaT)

Question	% of students who responded	Number of students who answered correctly
1. Smart City Content	39,8 %	39,8 %
2. Lean Canvas Content	31,5 %	31,5 %

**c) Use of Microsoft Teams**

The use of the Teams platform has made possible:

1. The combination of face-to-face and on-line classes simultaneously in the classrooms, allowing confined students to attend class.



2. To teach on-line when the teacher has been the confined student.
3. Switching from face-to-face to on-line teaching and vice versa when the pandemic situation has required it.
4. The collaborative work, synchronous and asynchronous, of the work teams to develop their business project.
5. Interaction among students and between students and teachers in an asynchronous manner.

No data are available to indicate the level of activity carried out.

#### **4.3. Do they facilitate meeting the 4 key challenges of blended learning environments: incorporating flexibility, encouraging interaction, facilitating the learning process for students and fostering an effective learning environment?**

**a) Incorporate flexibility:** Students have had a certain level of control over the time, place, and pace of learning as it has combined teacher control and self-organization of each work team:

1. Given a context (Smart City, COVID + solution to a social problem) each work team has had autonomy to choose its business idea.
2. Each work team has been organized and planned to go developing their project, interacting through Teams or other similar applications that allow synchronous and asynchronous collaborative work.

**b) Stimulate interaction:** The need to develop a team project and work collaboratively has stimulated interaction in each team. The defence of their project before the rest of the work teams has stimulated interaction among the whole group. The use of ICTs has allowed students who were isolated by COVID or in other parts of the world to defend their work and interact with their peers.

**c) Facilitating the students' learning process:** Due to the increased flexibility and autonomy of learners in blended learning environments, self-regulation becomes a critical factor for success [1], [3], [17]. The fact that less than 50% responded to the video viewing and text reading control questions could confirm, as shown some authors Owston et al., (2013) and Tsai & Shen, (2009), [14], [16], that increased flexibility and learner control is beneficial only for students who possess self-regulation skills.

**c) Fostering an effective learning climate:** From the classroom observation and the reflections expressed by the students, it could be said that a motivating and affective learning climate has been fostered. The teacher has shown empathy, has encouraged the students, and has directed attention to the relevant aspects of the task. They have encouraged active and non-judgmental listening in the class, as well as the acceptance of error and self-reflection as a tool for learning self-regulation.

#### **4.4. Do ITC contribute to the improvement of student learning outcomes?**

The nature of the project makes it impossible to delimit to what extent the results obtained by the students are due to the incorporation of ICT. Even in this first year of the project, it is difficult to conclude whether the methodological combination applied has contributed to improve these results, since they involve a set of variables such as classroom climate, university culture, motivation and attitude of teachers and students, etc., which have not been studied in this work.

However, we can conclude that, in a first assessment, and with the limits expressed in the previous paragraph, the results obtained have been in line with the rest of the students, whose PL have not been taught with this methodology.

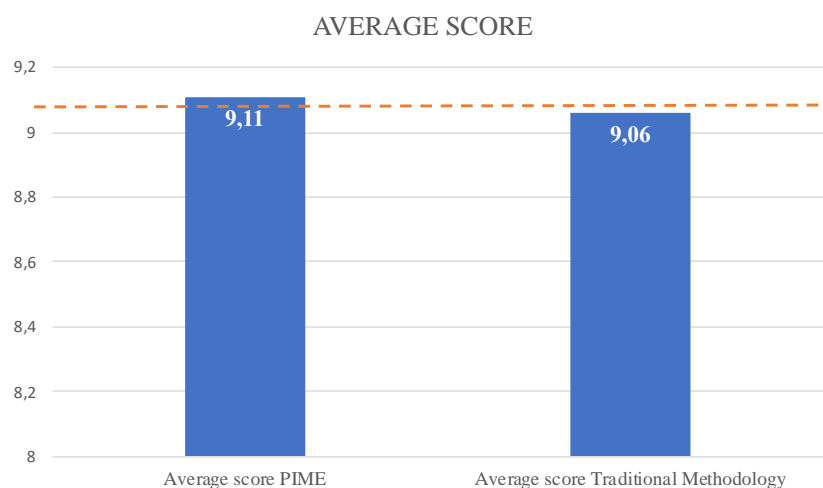
The PIME project had a duration of two academic years, which made it possible to plan the staggered participation of students in the subject. In the first academic year 183 students have

taken the internship within the PIME. One hundred and ten students have taken the internship with the new methodology and 73 with the traditional methodology. Finally, a total of 11 students has not submit their final work. The data in Table 5 shows the distribution of students by methodology.

**Table 5:** Distribution of students by methodology (source: the authors)

	<b>PIME</b>	<b>Traditional Methodology</b>	<b>TOTAL</b>
Enrolled	110	73	183
No presented	5	6	11
Total	105	67	172

Regarding the academic results of the final work, the average grade of the final work is 9.09. The average grade of the PIME students is 9.11 and the average grade with traditional methodology is 9.06 as shown in Figure 5.



**Fig. 5:** Average Score between blended methodology and normal methodology (source: the authors)

As can be seen in the graph, there are no significant representative differences in the results obtained, so no significant conclusions can be drawn. Most of the students in both groups obtained a grade in the range of 8 to 10. The quality of the work delivered is also influenced by a set of variables that could not be controlled, such as, for example, the time dedicated by the students, the motivation, or the previous preparation.

Although it is difficult to quantify whether the results are due to the methodologies used, the students' commitment or the teacher's level of demand, the comparison of the results suggests that the results obtained in content learning are adequate and similar to those obtained in other groups. Therefore, we can think that the implementation of the new methodologies has not greatly harmed the students' results.

During the second year of the project, the lessons learned in the first year will be implemented and participatory qualitative research activities will be implemented to investigate, among others, the level of satisfaction of students with the teaching innovation implemented, the extent to which it has facilitated the learning process, whether they have experienced more or less motivation, more or less interest, etc... differentiating, as far as possible, the effect of the three methodological components: use of ICT, Outcome-Based Education and blended learning.

## 5. Conclusions, limitations, and recommendations for further work

The objective of this study was to contribute to explain how the use of information and

communication technologies has made it possible contribute to teaching innovation, such as the application of the model, to bring a high degree of flexibility to university teaching, at the same time, resolving an unstable situation with COVID through a hybrid blended learning model involving the combination of face-to-face and online learning.

The first results have shown that ICTs are an extraordinary resource for the application of innovative teaching methodologies such as Outcome-Based Education and the use of the "Blended Learning" methodology. Blended learning with ICTs has shown that ICTs have greatly facilitated the methodological design of the PLs covered by the PIME, as well as the adaptation to the changing environment, presenting an opportunity for students to carry out individual and group, synchronous and asynchronous activities.

The main limitation is that it is necessary to provide classrooms, teachers, and students with adequate technological and multimedia equipment to facilitate the simultaneous use of face-to-face and on-line classes. This is because this simultaneous hybrid mode requires the teacher to be attending both the students in the classroom and those at home. For this it is necessary to have cameras, monitors, microphones and loudspeakers installed in the classroom that allow the students to watch the class on-line, while the teacher is moving around the classroom, or presenting theoretical contents by means of power point or similar.

We have also found limitations in the current design of e-learning platforms, which are designed more according to the traditional model than to the new pedagogical models. For example, difficulty in the design of complex tasks, continuous assessment tools, participatory assessment, collection of evidence of the level of student satisfaction, the level of interaction in carrying out activities, among others.

Future research directions include firstly a close collaboration between experts in teaching methodologies and ICT experts is necessary for e-learning platforms to offer applications capable of supporting the new trends in teaching innovation and to facilitate the collection of statistical data with which to evaluate the results and impact of the projects. Secondly, it is necessary to involve students in the evaluation of teaching innovation projects and to have reliable and tested instruments that allow teachers to collect students' opinions.

The most highlighted finding that would benefit from future research is the conclusion that teaching in blended learning environments requires efforts to help students regulate their learning. In this regard, Vermunt & Verloop [18], suggest the need to implement four categories of regulatory strategies: guiding and planning, monitoring, adjusting, and assessing.

## 6. References.

1. Barnard, L., Lan, W. Y., To, Y. M., Paton, V. O., & Lai, S.-L. (2009). Measuring self-regulation in online and blended learning environments. *The Internet and Higher Education*, 12(1), 1–6. <http://doi.org/10.1016/j.iheduc.2008.10.005>
2. Boelens, R., De Wever, B., & Voet, M. (2017). Four key challenges to the design of blended learning: A systematic literature review. *Educational Research Review*, 22, 1–18. <https://doi.org/10.1016/j.edurev.2017.06.001>
3. Bonk, C. J., Kim, K.-J., & Zeng, T. (2006). Future directions of blended learning in higher education and workplace learning settings. In C. J. Bonk & C. R. Graham (Eds.), *The Handbook of Blended Learning: Global Perspectives, Local Designs* (pp. 550–567). San Francisco: Pfeiffer. Retrieved from [http://www.publicationsshare.com/c083\\_bonk\\_future.pdf](http://www.publicationshare.com/c083_bonk_future.pdf)
4. García-Cobos, Salvador. 2008. Proyecto Educativo Para La Integración de Las TIC En La Práctica Docente.
5. Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *Internet and Higher Education*, 7,95–105. <https://doi.org/10.1016/j.iheduc.2004.02.001>.
6. Graham, C. R. (2006). Blended learning systems: Definition, current trends and future directions. In C. J. Bonk & C. R. Graham (Eds.), *The handbook of blended learning: Global perspectives, local designs* (pp. 3–21). San Francisco: Pfeiffer
7. Graham, C. R. (2009). Blended Learning Models. In Khosrow-Pour, D.B.A., M. (Eds.), *Encyclopedia of Information Science and Technology*, Second Edition (pp. 375-382).

- IGI Global. <http://doi:10.4018/978-1-60566-026-4.ch063>
8. Hernando-Calvo, Alfredo. 2015. *Viaje a La Escuela Del Siglo XXI. Así Trabajan Los Colegios Más Innovadores Del Mundo*. Madrid (España): Fundación Telefónica.
  9. Hrastinski, S. (2019). What Do We Mean by Blended Learning? *TechTrends*, 63(5), 564–569. <https://doi.org/10.1007/s11528-019-00375-5>
  10. King, Jean A., and Karen M. Evans. 1991. “Can We Achieve Outcome-Based Education?” *Educational leadership: Journal of the Department of Supervision and Curriculum Development*, N.E.A octubre: 73–75.
  11. Martínez-Clares, P., M Martínez-Juárez, and J.M Muñoz-Cantero. 2008. “Formación Basada En Competencias En Educación Sanitaria: Aproximaciones a Enfoques y Modelos de Competencia.” *Relieve* 14(2): 1–23.
  12. Martínez Clares, Pilar, and Benito Echeverría Samanes. 2009. “Formación Basada En Competencias.” *Revista de Investigación Educativa* 27(1): 125–47.
  13. Montero-Curiel, Marisa. 2010. “El Proceso de Bolonia y Las Nuevas Competencias.” *Tejuelo* 9(9): 19–37. <http://www.doaj.org/doaj?func=abstract&id=619478>.
  14. Owston, R., York, D., & Murtha, S. (2013). Student perceptions and achievement in a university blended learning strategic initiative. *The Internet and Higher Education*, 18, 38–46. <http://doi.org/10.1016/j.iheduc.2012.12.003>
  15. Singer, F. M., & Stoicescu, D. (2011). Using blended learning as a tool to strengthen teaching competences. *Procedia Computer Science*, 3, 1527–1531. <https://doi.org/10.1016/j.procs.2011.01.043>
  16. Tsai, C.-W., & Shen, P.-D. (2009). Applying web-enabled self-regulated learning and problem-based learning with initiation to involve low-achieving students in learning. *Computers in Human Behavior*, 25(6), 1189–1194. <http://doi.org/10.1016/j.chb.2009.05.013>
  17. Van Laer, S., & Elen, J. (2016). In search of attributes that support self-regulation in blended learning environments. *Education and Information Technologies*. <http://doi.org/10.1007/s10639-016-9505-x>
  18. Vermunt, J. D., & Verloop, N. (1999). Congruence and friction between learning and teaching. *Learning and Instruction*, 9, 257–280. [http://doi.org/10.1016/S0959-4752\(98\)00028-0](http://doi.org/10.1016/S0959-4752(98)00028-0)
  19. Witthaus, G., Rodriguez, B. C. P., Guardia, L., & Campillo, C. G. (2016). *Next Generation Pedagogy: IDEAS for Online and Blended Higher Education*. Final report of the FUTURA (Future of University Teaching: update and roadmap for advancement) project. Report. <https://hdl.handle.net/2134/23893>