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RESEARCH

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BLENDED LEARNING: PERFORMANCE AND ASSESSMENT OF ICT RESOURCES IN HIGHER EDUCATION LEVEL

La enseñanza semipresencial: rendimiento y valoración de los recursos TIC en la docencia universitaria

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ABSTRACT

The COVID pandemic forced higher education centers to adapt teaching conditions according to current regulations. The University of Valladolid settled a student presence on alternative weeks. The purpose of this work is to study the impact of the methodological innovation project applied in three subjects of the degree in Advertising and Public Relations during the 20/21 academic year. A survey was used to know the students' opinions and the analysis of the academic performance of the students in comparison with the results of previous years in the same subject. The students confirmed the adequacy of the teaching resources and are satisfied with their adaptation to the demands of the situation. Academic performance has improved compared to the previous year; students have been more constant in their effort on the subjects and approve the implementation of most of the teaching resources used. Although the classroom attendance system does not reach high consensus approval by the students. These results highlight the need to continue researching about teaching methods in the university context to improve the quality of the higher education system.

Keywords: Teaching innovation, ICT, Blended learning, Academic performance, Teaching resources evaluation.

RESUMEN

La pandemia del COVID obligó a los centros de educación superior a adaptar la docencia según la normativa vigente. En este sentido, la Universidad de Valladolid optó por la presencialidad en semanas alternas. El objetivo de esta investigación es estudiar la repercusión de esta adaptación metodológica en tres asignaturas del grado de Publicidad y Relaciones Públicas durante el curso 20/21. Para ello, se recurrió a una encuesta para recoger la valoración de los alumnos y el análisis del rendimiento académico de los alumnos en comparación con el de cursos académicos previos en la misma asignatura. Los resultados ponen de manifiesto la adecuación positiva de los recursos docentes utilizados y su adaptación a las demandas de la situación. Además, el rendimiento académico ha mejorado respecto al año anterior siendo los alumnos más constantes en su dedicación a las asignaturas. A pesar de estos buenos resultados la asistencia en alternancia a las clases no cuenta con la aprobación consensuada de todos los estudiantes. Estos resultados ponen de manifiesto la necesidad de seguir investigando sobre la docencia en el contexto universitario para mejorar la calidad del sistema educativo superior.

Palabras clave: Innovación docente, TIC, Docencia semipresencial, Rendimiento académico, Evaluación docente.

O ENSINO SEMI-PRESENCIAL: DESEMPENHO E AVALIAÇÃO DOS RECURSOS TIC NO ENSINO UNIVERSITÁRIO

RESUMO

A pandemia de COVID obrigou os centros de ensino superior a adaptar o ensino de acordo com os regulamentos em vigor. Nesse sentido, a Universidade de Valladolid optou pelo atendimento em semanas alternadas. O objetivo desta investigação é estudar a repercussão desta adaptação metodológica em três disciplinas da licenciatura em Publicidade e Relações Públicas durante o ano letivo 20/21. Para isso, foi utilizada uma pesquisa para coletar a avaliação dos alunos e a análise do desempenho acadêmico dos alunos em comparação com o de cursos acadêmicos anteriores na mesma disciplina. Os resultados mostram a adequação positiva dos recursos pedagógicos utilizados e sua adaptação às demandas da situação. Além disso, o desempenho acadêmico melhorou em relação ao ano anterior, com os alunos sendo mais constantes na dedicação às disciplinas. Apesar desses bons resultados, a frequência nas aulas alternadas não tem a aprovação consensual de todos os alunos. Esses resultados mostram a necessidade de mais pesquisas sobre o ensino no contexto universitário para melhorar a qualidade do sistema de ensino superior.

Palavras chave: Inovação pedagógica, TIC, ensino misto, desempenho acadêmico, avaliação de professores.

Translation by **Paula González** (Universidad Católica Andrés Bello, Venezuela)

1. INTRODUCTION

The COVID-19 crisis marked a turning point in the digital transformation advocated by the European Higher Education Area (EHEA). Among the different training modalities, blended learning (b-learning), also known as bimodal or hybrid learning, gained special relevance in the 20-21 academic year, which attempts to combine the benefits of face-to-face education with those of distance education (Hinojo-Lucena et al., 2009) and ICTs. In line with the Bologna spirit, the blended model focuses on handing over responsibility for learning to students, who are given a more active and autonomous role (Marsh et al., 2003), making them the center of the learning process -Student learning center-. The key is not to learn more but to learn differently and prepare citizens for "a society in which access to information and decision-making become the distinctive elements of quality education" (Bartolomé, 2004, p. 17), for which teaching that stimulates interaction, incorporates flexibility, facilitates learning processes, and fosters an affective learning climate is necessary (Boelens et al., 2017).

In this blended and fluid mode, the teacher's mission is to generate learning opportunities both inside and outside the classroom, hence, apart from knowing their subject, they have to control the different teaching strategies that facilitate learning, besides attending to the student's feedback to improve educational practice (Carranza and Caldera, 2018). Any learning experience in which the teacher incorporates a virtual environment can be considered bimodal, and the difficulty of the challenges will depend on the combination between face-to-face activities and ICT-mediated activities (Salinas et al., 2018).

2. LITERATURE REVIEW

Currently, there are already academic works on blended learning (Salinas et al., 2018; Güzer and Caner 2014; Bartolomé et al., 2018, among others), but since 2015 there has been a rising interest, as demonstrated by the study by Semanate-Quiñonez et al. (2021). For this reason, the literature review has been structured in three key moments of the implementation and/or future of the b-learning modality in higher education: the pre-pandemic period, the 2019-20 academic year with the 'emergency remote learning' (Hodges et al. 2020; Llorens-Lago, 2020) and, thirdly, the 2020-21 academic year, to which this research belongs, characterized by the widespread implementation by force majeure of the hybrid modality.

2.1. Pre-pandemic period

From the pre-pandemic era, it is worth mentioning the studies on experiences of the implementation of b-learning in specific subjects in Spain. Hinojo-Lucena et al. (2009) apply it to the subject of Psychopedagogy, observing that students perceive more advantages in this modality -time flexibility, accessibility to information, faster communication, or development and updating of contents- than disadvantages —reduction of human contact—. Moral-Moral and Férnandez-Alles (2014) apply it to the subject of Marketing Management, concluding that hybrid training strengthens the acquisition of competencies, autonomous learning, and skills for lifelong learning. In both cases, the technological training deficiencies of the teaching staff are highlighted.

For their part, Infante-Moro et al. (2017), work with the subject of Information Resources Management and replace a Course Zero of traditional face-to-face teaching with a MOOC experience. Student acceptance was high and the main drawback perceived by the students was the time consumption of this activity. Castaño et al. (2017) apply blended learning to several subjects of the Primary Education Degree, noting that student satisfaction is more influenced by the methodology used than by the teaching staff or the contents. Other works on b-learning experiences are those carried out by Flores et al. (2015) on the subject of Architectural Language or by Cerón et al. (2014) on the subject of Professional Ethics. In all these cases, the main data collection tool was the questionnaire applied to students. In turn, the work of Carrio et al. (2022) shows positive results in grades and satisfaction of the Philosophy of Law students with the use of b-learning, since the students valued their participation during the course and the idleness and disinterest in the lectures of previous courses were avoided.

Regarding research aimed at knowing the perceptions of teachers, it is worth highlighting that of Ciabocchi et al. (2016) who applied a questionnaire to members of the American Association of University Professors, concluding that traditional face-to-face teaching is still preferred by teachers and that what worries about b-learning is more focused on the effort of preparing the courses than on the quality of the results of these. More recent studies determine that the degree of teacher satisfaction is marked by the degree of satisfaction found in their students (Li et al., 2021).

2.2. Period of `emergency remote learning´

During the second semester of the 2019-20 academic year, emergency remote learning was experienced, which highlighted the lack of preparation of teachers, students, and the virtual platforms themselves to abandon teaching based on teaching-student face-to-face learning and education (Grande-de-Prado et al., 2021; Cabero-Almanara and Llorente-Cejudo, 2020; Castillo-Olivares and Castillo-Olivares, 2021; Guzmán-Arce et al., 2022). Maggio (2020) even speaks of two phases during the confinement: an initial one of adaptation of face-to-face content to a more digital format that provoked students' complaints about the abundance and feeling of saturation; and a second, more evolved phase, in which contemporary cultural forms such as on-demand content were incorporated. Although the use of other proposals that make students interact and collaborate is still lacking -memes, podcasts, Instagram stories, etc.-.

The adaptation affected teaching practice and evaluation; if for the former, teachers already had some experience with virtual classrooms, the evaluation had far fewer training resources in this regard (González et al., 2020). As Bozkurt and Sharma (2020) point out, it is necessary to differentiate between the pandemic scenario and online teaching. In the pandemic context, according to González et al. (2020), the key objectives were not to lose the academic year and to ensure the quality of teaching and learning. This led to decisions being taken in the form of a Decree that called for a shift from face-to-face teaching to "distance and online modalities" (Official State Gazette, 2020). This led to, in many cases, a mere transposition of content, which did not involve a methodological approach integrated into the educational plan, as required by a true

online education (Bozkurt and Sharma, 2020; García-Peñalvo, 2020; Luo et al., 2017). In this regard, Sáiz-Manzanares et al. (2022) differentiated between e-learning, developed during the first pandemic year and b-learning in the second pandemic year. These authors compared the satisfaction of third-year Health Sciences students with both modalities; the results show greater satisfaction in the first year, e-learning, although in both cases the scores were above 4 out of 5.

Within teaching practice, the application of active methodologies is the protagonist of the published works. This denomination underlies the idea of the student at the center of the learning process: students learn through interaction with materials and competencies take center stage as opposed to content (López Noruego, 2013; Zabalza, 2004), which according to some authors provides more effective learning environments for students (Leibowitz et al., 2016). The work of Llorens-Largo et al. (2021), within this modality, reports good results in the urgent adaptation of project-based learning to a remote context thanks, among other things, to the fact that it was an active learning methodology and that it was an activity that had begun in the first semester in a face-to-face manner so that all participants knew each other. Area-Moreira et al. (2020), for their part, present the need to integrate active methodologies with virtual spaces following each project and conceived for students' autonomous learning, although they warn that the freedom to achieve learning arouses misgivings in certain sectors of the student body.

Regarding evaluation, Castillo-Olivares and Castillo-Olivares (2021) conclude that during the pandemic many teachers have rethought the meaning and methodology of evaluation due to the impossibility of guaranteeing the authorship of the exams. The new experiences implemented -project work, case studies, diaries, etc.- imply a greater effort on the part of teachers as they require a personalized approach and more individualized work.

Similarly, Grande-de-Prado et al. (2021) consider that evaluation has been one of the most sensitive aspects of this emergency and recommend continuous and varied evaluation that reduces or eliminates final tests. They also see technological resources as powerful tools, but they require planning, organization, and flexibility to get the most out of them.

2.3. 2020/2021 academic year

In the 20-21 academic year, the hybrid modality was imposed in a generalized manner out of necessity, adapting the methodologies to a blended environment. However, it is still necessary to share methodologies, processes, evaluations, successes, and/or difficulties that help to develop a better blended learning-teaching process (Suyo-Vega et al., 2021) that go beyond the mere transposition of content and are integrated into an educational framework. After all, the pandemic has only accelerated a process that had already begun previously, and that is that the traditional school needs changes to respond to the new challenges posed by an increasingly digitalized society (González-Pérez and Sosa-Díaz, 2021).

For this reason, the purpose of this paper is to assess the methodological adaptation made to bimodal teaching in undergraduate studies at the Universidad de Valladolid. Thus, contributes to configuring a theoretical framework, nonexistent according to Salinas-Ibáñez et al. (2018), that guides teachers and administrations on how to organize b-learning effectively.

The first objective of the research focuses on knowing the students' assessment of the blended learning experience. Specifically, the aim is to find out to what extent the alternating teaching has been satisfactory for the students. Furthermore, the aim is to identify the students' work strategies and their adaptation to the demands of the new circumstances. Finally, we proceed to evaluate the usefulness of the teaching resources created for the development of students' work. The third objective of the research focuses on finding out whether bimodal teaching and the actions taken for its adaptation have led to an improvement or a worsening of students' academic results.

3. METHODOLOGY

3.1. Context

The study is carried out with three subjects of the Degree in Advertising and Public Relations of the Universidad de Valladolid that are taught in the third and fourth years. Advertising media: research, planning, and management (compulsory); Advertising effectiveness research (compulsory); and Reception studies laboratory (optional). These three subjects are part of a teaching innovation project that began in the 19/20 academic year in which interactive resources are developed through Excel spreadsheet templates and video tutorials on their execution for applied learning, called knowledge pills. The above subjects require the handling, calculation, and interpretation of numerical data, something that gives them a highly applied component and gives them a higher degree of difficulty than other subjects of the degree. The COVID measures of the Faculty of Social Sciences, Law, and Communication of the UVa, where the degree is taught, were as follows: classroom attendance was carried out on alternate weeks, classes were broadcast synchronously by a video call from the classroom so that students could follow the session live and intervene in it. The sessions were recorded on the virtual platform. In the adaptation to bimodal teaching in the subjects of the study, the delivery of all the practical activities was facilitated through the virtual campus, the work materials were provided on this same platform, the number of practices was increased, linking a practical activity to each subject, and the importance of each practice in the final evaluation was increased. The final score accumulated the results of each activity, only if at least 60% of the contents were successfully resolved, giving the possibility of passing the course if most of the practical activities were completed.

3.2. Instrument and procedure

The first objective tests the evaluation of teaching resources and blended learning, for which a questionnaire is used. In addition to the classification data on the subjects and groups, two questions are included on the perceived difficulty of the subject compared

to other subjects, two questions on their dedication to the demands of the degree, the degree of satisfaction with the bimodal teaching system, and the evaluation of the usefulness of seven specific actions: the delivery of practical activities on-line, broadcasting of class sessions, recording of classes, on-line evaluations, availability of materials before the session, video tutorials (knowledge pills) and the mixed attendance model.

The second question to be addressed is to know to what extent the methodological adaptations carried out influence the students' work strategy. For this purpose, three closed questions have been created, asking about the dedication to the subjects in comparison with previous years, the usual work strategy in the degree course, and the changes in the work strategy during the academic year.

Thirdly, to determine the impact of blended learning on academic performance, the grades obtained by students in the first exam of two academic years were used. The 19/20 academic year, in which teaching innovation is implemented for the first time with templates and video tutorials, and the 20/21 academic year, in which, besides using the resources created in the previous academic year, the adaptations to bimodal teaching are incorporated.

3.3. Sample

The evaluation of the teaching methodology is implemented with a sample of 159 students enrolled in one of the subjects of the study, who voluntarily agreed to participate in the monitoring of the subjects. The participants were distributed as follows: 56.4% belonged to Advertising Effectiveness Research, 31.6% were taking Advertising Media: Research, Planning, and Management, and the remaining 11.9% were taking the Reception Studies Laboratory. It is noteworthy that 21.3% of the students were enrolled in more than one subject, but only one response per student is counted.

The academic performance of the teaching was carried out by taking all the students enrolled in the subjects in the two academic years analyzed: 19/20 with 434 students enrolled and 20/21 with 440 students. The classes under study are equivalent in terms of the number of students, and the professors teach the same subjects to both classes so that the only differences between the two groups are derived from the bimodal teaching and its adaptation as indicated in the context. For the comparison, the qualitative qualification of the first call has been used.

4. RESULTS

4.1. Appraisal of teaching resources and coping strategies

The difficulty of the subjects that make up the teaching innovation can be seen in the students' responses. 42.4% consider these subjects to be more difficult than the subjects taken in previous years (values four and five on the scale), compared to 13.3% who assign them low difficulty (values one and two on the scale); for the remaining 44.3%, the same levels of difficulty are maintained. As shown in Table 1, quite similar results are obtained when asked about the difficulty regarding the subjects of the current

academic year. These results confirm that four out of ten students approach the subjects with difficulty, possibly due to the technical-applied component of the subject.

Table 1.
The difficulty of the subjects

	No difficulty	1	2	3	4	5	Much difficulty
The difficulty of subject vs. others from previous years		1.9%	11.4%	44.3%	30.4%	12%	
The difficulty of subject vs. others this year		1.9%	7.5%	48.4%	34%	8.2%	

Source: Own elaboration.

The first research question addresses student satisfaction with bimodal teaching. The results in Table 2 show that 51.3% of the respondents consider the bimodal teaching system to be quite or very satisfactory (categories 4 and 5), one out of four students (25.5%) consider it not at all or not very satisfactory (categories 1 and 2), and the remaining 23.4% report a medium level of satisfaction.

Table 2.
Assessment of the subject with a bimodal system

Unsatisfactory	1	2	3	4	5	Highly satisfactory
% Percentage	3.2%	22.2%	23.4%	28.5%	22.8%	
No. of cases	5	35	37	45	36	

Source: Own elaboration.

Secondly, the paper aims to evaluate the incorporation of the teaching resources used in the 20/21 academic year, as shown in Table 3. The first aspect evaluated is the mixed attendance model, a key element of the bimodal adaptation carried out by the Universidad de Valladolid. The results indicate that 38.9% of the participants found the experience useful, while 44.6% did not see its usefulness. Curiously, 16.6% were not willing or able to evaluate the modality in terms of the benefit obtained. Clearly, the measure has clear advantages over the possibility of receiving classes remotely and other disadvantages compared to face-to-face classes.

Going into the details of the teaching resources developed for this teaching modality, it can be seen that there is a clear consensus when it comes to considering the usefulness of most of the actions. The teacher-student relationship has been centralized in the virtual campus space, in the same way as in previous courses, and mainly affects the organization of the subject, the distribution of contents, and the delivery of practical activities. Between 96.2% and 93% of those surveyed found these resources useful enough to incorporate them into the teaching of the subjects (Table 3).

Besides these resources, there are also audiovisual materials in the form of short videos and teaching templates developed within the framework of the teaching innovation project, which are focused on the practical activities of a certain number of subjects. In a similar trend, they obtain a high consensus on their usefulness (92.4%).

Lastly, the actions incorporated to adapt the subjects to blended learning are the retransmission of the classes, the recording of the sessions, the evaluation of each subject with practical activity, and its online evaluation. The retransmission of classes seems to be a resource accepted by three out of four students (76.6%), while the recording of classes is considered somewhat more useful, 86% value positively the continuity of this resource. Regarding the evaluation of each topic with practical activity, 80.9% opt for its continuity, while the online evaluation is a measure that does not reach as much unanimity as the previous ones, with a 65.4% approval rate.

Table 3.
Incorporation of bimodal teaching resources into regular teaching

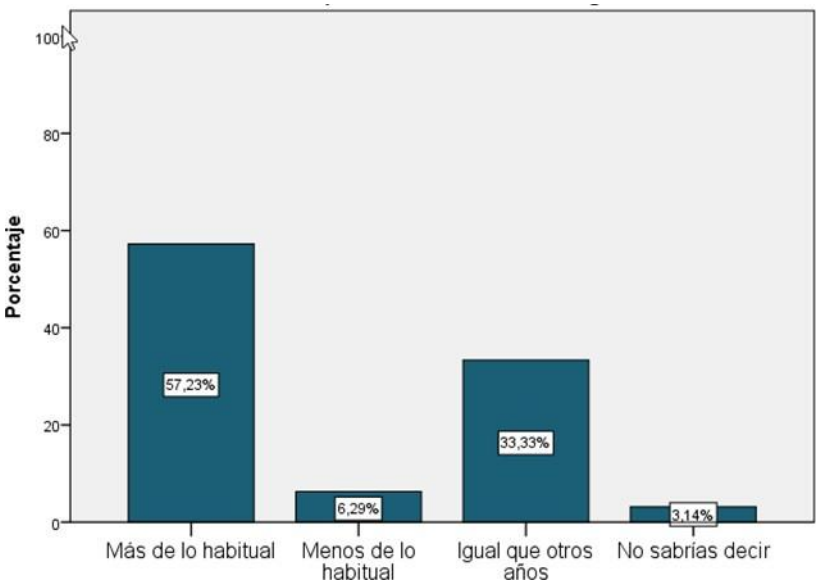
	It is useful	It is not useful	Don't know	Average score (Standard deviation)
Mixed attendance model (online and face-to-face).	38.9%	44.6%	16.6%	1.78 (.713)
Delivery of practical activities through virtual campus tasks.	96.2%	2.5%	1.3%	1.05 (.272)
Availability of materials in advance	93.0%	3.8%	3.2%	1.10 (.394)
Availability of short videos (pills) to explain specific aspects of the subject (PID).	92.4%	1.3%	6.3%	1.14(.498)
Retransmission of the classes	76.6%	18.4%	5.1%	1.28(.554)
Recording the classes	86.0%	6.4%	7.6%	1.22(.570)
Evaluate each topic with a practical activity	80.9%	8.3%	10.8%	1.3 (.655)
Online evaluations	65.4%	17.9%	16.7%	1.51(.766)

Source: Own elaboration.

The second objective focuses on the students' coping strategy in the face of bimodal teaching. Regarding the time required by the subjects in this course, 57.2% of the students stated that this year they had dedicated more time than usual to the subjects and 33.3% stated that it had been similar to that of previous years. Only 6.3% of them stated that they had devoted less time to the subjects than in previous years.

Figure 1.

Evaluation of the time dedicated to the subjects during the 20/21 academic year.

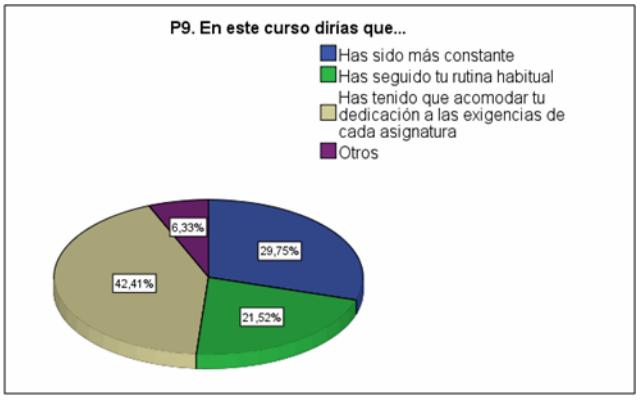


Source: Own elaboration.

In this regard, a snapshot of the usual work strategy among students and what happened in this course has been collected as shown in Figures 2 and 3. Most of the students state that they tend to prepare the subjects according to the teacher's demands, that is, according to the deadlines set for the delivery of activities. Two out of three students (67.1%) are in this mode. Consistency is not the most common strategy of the students surveyed, although 16.5% are in this mode of work, leaving 12% who recognize that they devote effort when they perceive that the subject is already advanced and 4.4% who leave it to the last minute.

The most notable changes declared are that practically three out of every ten students have been more constant in their work during this academic year, while the percentage who adapt their work to the demands of the subjects has decreased. It could be said that the scheduling of activities has generated more consistency and, although 42.4% continue to accommodate their dedication to the demands of the subjects, on the whole, there is a change in strategy.

Figures 2 and 3.
Student work strategy for subjects



Source: Own elaboration.

4.2. Academic performance

Table 4 shows the academic results for all students in the two academic years under study. The Chi-square statistic was used to test for differences in performance. The results show that the differences in academic results are not due to chance (Chi-square 27.321; 4 g.l. p=.000). A detailed analysis of where the differences occur provides the key to interpreting this result. Looking at the category of failures, it can be seen that in the 19/20 academic year this percentage is 13.8%, while in the following year it drops to 8.9%. This same trend is repeated in the no-show category, which in the 20/21 academic year is lower than in the 19/20 academic year. On the other hand, in the category of passing grades, it goes from 32.9% to 34.9%, and in the category of merit grades, the difference is even greater, going from 32.3% to 40.9%. The only category in which the 20/21 results are not exceeded is the category of students receiving the highest grade. Overall, the ratio of failures is lower and the qualitative performance of the students is also improved.

Table 5.
Comparison of academic performance

	NP	Fail	Pass	Merit	Outstanding	Total (nº cases)
Course 2019/2020	14.5%	13.8%*	32.9%	32.3%	6.5%*	100% (n=434)
Course 2020/2021	12.3%	8.9%**	36.8%	40.9%*	1.1%**	100% (n=440)
Total	13.4%	11.3%	34.9%	36.6%	3.8%	100% (n=874)
Chi-square			*27.321; 4 g.l. (p=<.001)*			

Source: Own elaboration.

5. DISCUSSION

The results provided in this research show that the adaptation of students to new circumstances has been key to explaining academic improvement. The fact that students have dedicated more time to the subjects has benefited the results, in line with

other studies that point to student involvement and participation as determining elements in the grades (Martín García et al., 2020). Apart from dedication, it seems important to take into account the adaptation of their work strategies to the demands of the subjects and carrying out more constant work (Llorens-Largo et al., 2021). It should be taken into account that under this teaching modality students have had to be more active in following the sessions and working with the subject materials, which may explain the results (Bonwell and Eison, 1991; Hackathorn et al., 2011; Wright, 2011; López-Noguero, 2013). On the other hand, how practical activities have been implemented and the importance given to them in the final evaluation has encouraged this way of working, which has yielded its benefits (Grande-de-Prado et al., 2021). Influencing the importance of carrying out an adaptation in the evaluation mode according to the implemented methodology.

When evaluating blended learning as a teaching methodology, the results show that half of the students are fairly or very satisfied with bimodal teaching. To understand this assessment, it was considered key to analyze the methodological resources common to the implementation of this type of teaching. There is a clear consensus among the students to integrate most of the implemented actions aimed fundamentally at integrating students' autonomous learning, as stated by Marsh et al. In this modality, the availability of materials in advance, short videos (teaching pills), and the recording of classes that allow students the necessary flexibility to direct their own learning stand out, a line of work already pointed out by other authors (Area-Moreira et al., 2020; Llorens-Largo et al., 2021).

6. CONCLUSIONS

The work provides a useful reference on the implementation of bimodal teaching carried out at the Universidad de Valladolid using complementary methodologies that support the interpretation of the results obtained. On the one hand, the teaching results confirm that the implementation of bimodal teaching has improved the academic performance of the students. This teaching improvement translates into a decrease in the number of people who do not pass the first exam, taking into account that it has favored the students presenting the first exam, and improved the results in the number of passes and grades.

It cannot be hidden that one out of every four students disagrees with the bimodal teaching system. Once again, if we look at the evaluation of teaching resources, we find that the mixed attendance model does not seem valid for almost half of the students. What is certain is that monitoring the development of content at a distance obviously presents more difficulty, requiring greater effort on the part of the student. Despite these drawbacks, it can be said that the resources made available to the students have, to a large extent, made up for the disadvantages.

Finally, there are some considerations about the study that should be highlighted. It has been carried out in three different teaching subjects, with the participation of four teachers, highlighting that it is not a one-off teaching action, which also takes a longitudinal perspective. Another of the conditioning factors of the work is

determined by the fact that the subjects analyzed are of medium/high difficulty and have a technical component in the degree in Advertising and Public Relations. An extension of the analysis to other types of subjects would provide a more complete view of the performance of bimodal teaching.

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