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**HOW HAS LOMCE  
AFFECTED COLLEGE  
ACADEMIC  
PERFORMANCE?**

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**Abstract:** The LOMCE establishes as its main pillars the reorganization of the Compulsory Secondary Education and Baccalaureate curriculum and the implementation of an external evaluation system. In itacademic year 2016-17the implementation of the new curricular organization that affects the secondary and pre-university stages is finished. The objective of this work is to compare the academic results obtained by university students who had previously studied the curricular contents according to LOE (2014-2015) or LOMCE (2017-2018). The population under study was new students enrolled in the Physics subject of the Pharmacy degree. The success rate and the specific subjects selected by the student in Baccalaureate were used as evaluative parameters. The results obtained show a higher performance in the LOMCE students, 64% compared to 43% of the LOE students. The Chemistry and Biology tandem continues to be the choice par excellence to pursue careers in Health Sciences (~77% for both periods), observing an increase from 18 to 29%, the latter with the LOMCE, in the choice of the Physics subject. Mostly, the choice of Physics is associated with Chemistry, compared to Mathematics with the LOE and others in the LOMCE. In addition, during the course of Physics classes, a greater knowledge and agility of mathematical calculation has been observed. The results obtained show a higher success rate in LOMCE students, along with an increase in notable and outstanding students in handling the subject. This may be the consequence of the increase in compulsory Physics and Chemistry hours during the BAT in the Valencian community with the LOMCE. Likewise, the increase in hours in Mathematics would lead to a greater ability to calculate, as has been observed every day in the classroom.

**Keywords:** Physics, educational curriculum, LOE, LOMCE, degree in Pharmacy, BAT.

## INTRODUCTION

National educational systems emerged in Europe at the beginning of the 19th century as a result of the French Revolution. In Spain, the Constitution of 1812 incorporates the idea of education as a framework in whose organization, financing and control the State must intervene, thereby laying the foundations for the establishment of the Spanish educational system. However, its final realization culminated in the approval, in 1857, of the so-called Moyano Law. Since then, the different political events have been accompanied by adaptations or regulatory changes to establish the defining lines of the Spanish educational system. In fact, the political influence is such that, on occasions, laws are approved that are never implemented. For example, the 2002 LOCE, which was replaced in 2006 by the LOE,

Since the approval of the Spanish Constitution in 1978, the non-university education system has undergone eight legislative changes, compared to only four for the university. The autonomy of the latter makes it enjoy greater stability. However, if this stability is not reflected at the lower levels, it causes the university system itself to falter. All legislative changes do not affect in the same way, some are simply structural, but others, such as curricular ones, mark the contents, subjects and resources that must be addressed in the different established educational levels. The latter are the foundations of the teaching-learning process.

Currently, the non-university educational system is regulated by the LOMLOE (Organic Law that Modifies the Organic Law of Education) approved in 2020, and currently being implemented that will end in 2023/24. As its name indicates, it modifies the LOE (Organic Law of Education) of 2006, which had previously been modified in the LOMCE (Organic Law for the Improvement

of Educational Quality) of 2013, currently repealed. The LOMCE established as main pillars, the reorganization of the Compulsory Secondary Education (ESO) and Baccalaureate (BAT) curriculum, in addition to the implementation of an external evaluation system, the revalidated controversies that were not really implemented (RD5/20167). Thus, for example, the LOMCE divides the subjects into core subjects, the contents of which are determined by the government, specific and free configuration that depend on the regional administrations.

Specifically, in the Valencian Community, the baccalaureate curriculum, a pre-university stage and two years long, for the Science modality, establishes Mathematics as a specific “core” subject, both in the first and second years. And, as a “core” subject of free configuration Physics and Chemistry in the first year. The implementation of the LOMCE began in the 2015-16 academic year, establishing the new curricular organization in the first and second year of ESO and in the first year of BAT, completing the following year with the rest of the courses, affecting more than 200,000 young Valencians. Then, in the 2017-2018 academic year, the students admitted to the university were the first to have previously taken the BAT with the LOMCE curricular model.

## **MATERIAL AND METHODS**

The study population consists of 400 new students, in the Pharmacy degree of the Miguel Hernández University, who had taken the subject of Physics during the first quarter of the first year. Two groups are distinguished, according to the curriculum followed in BAT: (1) LOE students, who entered the university in the 2014-15 academic year and fully completed the LOE; and, (2) LOMCE students who entered the university in the year 2017-18. These students were the first to arrive at

the university having taken the BAT with the LOMCE, since they still took ESO with the LOE.

The parameters used to evaluate the academic results were the success rate and the specific subjects taken at BAT. The success rate (TE) is the quotient between the number of students passed and the number of students presented. This is usually more precise and, therefore, more reliable, when considering different evaluation systems that generally differ precisely in the number of students presented. The success rate is calculated from the marks obtained in the exams of the ordinary call, since it registers a greater number of students presented. On the other hand, the information related to the specific subjects studied in BAT was obtained through questionnaires using the Moodle platform. These consisted of 10 items, seven related to the pre-university stage and three to the university. In such a way that the information related to the specific subjects, it was complemented with personal information (subject grades, global BAT grade) and with the characteristics of the educational center (autonomous community, public/private/concerted). While the university information was related to the admission to the degree in Pharmacy (motivation, mode and grade). Said information would complement, in addition to helping to achieve the planned objectives, it will serve to describe each group of students in more detail and, consequently, identify other possible causes that could mask the results obtained.

## **RESULTS AND DISCUSSION**

In the study, finally, repeating students were not considered, nor were students who did not adequately answer the questionnaire. According to these guidelines, the ‘study population constituted 63.1% of the initial sample.

Figure 1 shows the main results obtained on the characteristics of the groups studied, after the analysis of the items included in the questionnaire. The population studied was made up mostly of women, representing 82% and 70% in 2017-18 and 2014-15, respectively.

Regarding the pre-university stage, approximately 80% of both groups took it in educational centers in the Valencian community, the rest took it in other communities, except <2% who took it in non-national centers. The latter came from France, Italy or Morocco. The students from other communities came mainly from Murcia and Castilla la Mancha, with practically similar percentages for each year. Other communities such as the Basque Country, Andalusia, the Canary Islands or the Balearic Islands were represented with percentages of less than 2%.

The largest number of students from Murcia and Castilla La Mancha is possibly due to geographical proximity. In addition, it was observed that the percentage of students coming from these communities in 2014-15 was double that of 2017-18, reaching 25% and 47% respectively. We think that this fact could be due to the lower offer of places in the Pharmacy degree at local universities. In fact, the public universities of Murcia and Castilla la Mancha, the latter on the Albacete campus, offer 60 and 90 places respectively, compared to 125 places offered by the Miguel Hernández University. So the brightest students stay in local universities, especially motivated by the reduction in economic resources that living in a family environment means. Consequently, the less brilliant students are the ones who are forced to apply for a place in less nearby universities. This, depending on the demand that each year has this degree among the student body, may mean a lower grade for access in the universities with the greatest offer. However, this is simply an appreciation observed in the classrooms throughout our

years of university teaching. To corroborate it, it would be necessary to carry out a study designed for this purpose, and that was not the objective of this work. this is simply an appreciation observed in the classrooms throughout our years of university teaching. To corroborate it, it would be necessary to carry out a study designed for this purpose, and that was not the objective of this work. this is simply an appreciation observed in the classrooms throughout our years of university teaching. To corroborate it, it would be necessary to carry out a study designed for this purpose, and that was not the objective of this work.

Another of the aspects evaluated was the type of center, obtaining that the majority of BAT was studied in public centers, around 75% for both groups. While approximately 9% opted for subsidized centers and around 15% for private centers. It was not possible to determine the possible influence of the type of center on the average grade of the pre-university stage (global average grade of the 1st and 2nd year of BAT), nor on the entrance to the university that jointly considers the grades obtained in BAT and in the EBAU (Assessment of the Baccalaureate for University Access). Since it was observed that, sometimes, the registered BAT scores were > 10 points, when it is a score above 10 points. While in the entrance notes they rarely exceeded 10 points, when on this occasion it is scored over 14 points. This leads us to think that the items in the questionnaire were not clear enough, leading to errors and, therefore, they were excluded from the study. This also hindered the possibility of identifying whether the lower percentage of students from the communities of Murcia or Castilla La Mancha could be associated with their brilliance or not.

Lastly, the high rate of employability was the main motivation expressed by the

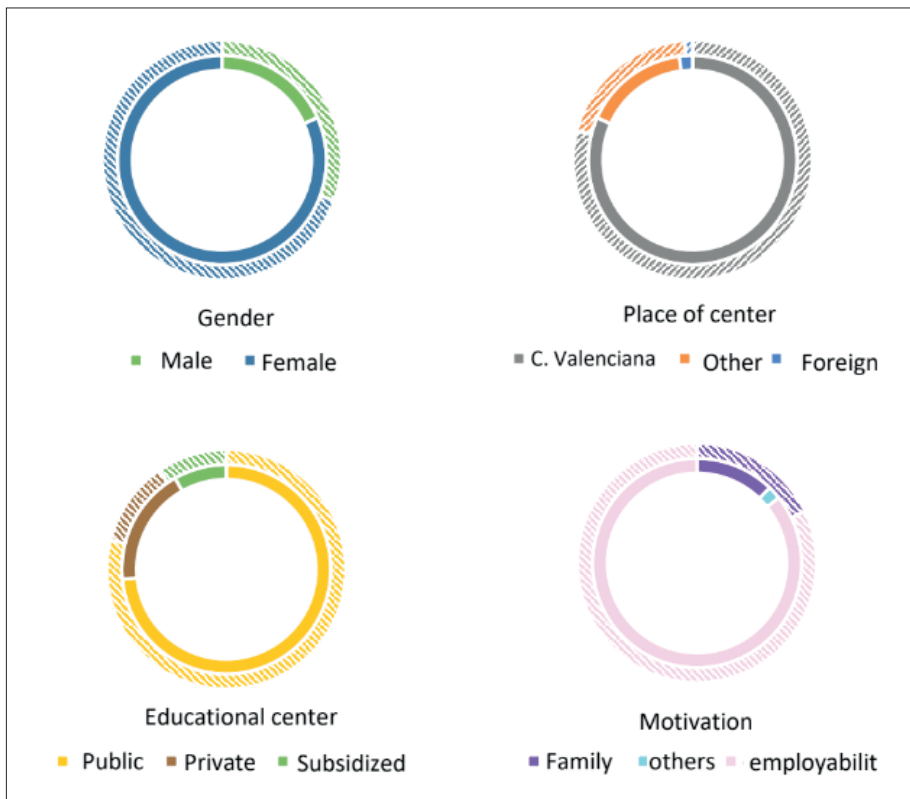


Figure 1. Results of the main items included in the questionnaires. Circular graph representation of the data obtained for the 2014-15 group (LOE) and the 2017-18 group (LOMCE). The latter represented on the outside and with a hatched area.

educational curriculum	Academic year	TEA (%) <sup>*</sup>	Ratings (%) <sup>*</sup>		
			Outstanding	Remarkable	Suitable
LOE	2014-15	43	3.3	16.7	23.3
LOMCE	2017-18	64	6.2	28.9	28.9

<sup>\*</sup>Ordinary February call

Table 1. Rates according to the system and learning process used

students to pursue a degree in Pharmacy. Only one student in 2017-18 who had previously completed the Intermediate Training Cycle in Pharmacy and Parapharmacy, a teacher had been her mentor. The rest indicated that her motivation was family, since some family member owned pharmacies, 18% of the 2014-15 student body and 12% of the 2017-18 student body.

With all this, it could be said that the items evaluated, in general, do not show significant differences between the representative populations of pre-university education LOE (2014-15) and LOMCE (2017-18). Therefore, the academic performance observed in the Physics subject could be attributed to the previous knowledge acquired in the pre-university stage, whose curriculum is regulated by different educational regulations. These, as previously mentioned, vary the educational curriculum which, specifically in the Valencian Community, mandatorily increases the number of hours of Mathematics, Physics and Chemistry, with the implementation of the LOMCE. However, that really depends, to a large extent, on the specific subjects that the students have finally chosen, both in the LOE and in the LOMCE. The first of them, it does not oblige to choose any specific subject, and the student body chooses three from among the subjects offered by the center; while in the LOMCE only two are chosen, since one of them is obligatorily established by the autonomous community.

The information collected in the questionnaires reveals that all the students had previously studied Physics and Chemistry, in the first year of BAT, as well as Mathematics, regardless of the educational curriculum studied. While, in the second year, the tandem of Chemistry and Biology subjects continues to be the choice par excellence to pursue careers in the Health Sciences branch, with approximately 77% of the students in both

periods. As for the Physics subject in the second year of the BAT, 18% of the 2014-15 students took it, compared to 29% of the 2017-18. Mostly, the choice of the Physics subject was linked to the choice of the Chemistry subject, compared to the Mathematics subject with the LOE and other subjects in the LOMCE. In addition, during the course of Physics classes during the 2017-18 academic year, Surprisingly, the students showed greater mathematical knowledge and greater alacrity in calculation. This, really, was the motivation that led us to propose this work.

Finally, the analysis of the academic results obtained for each LOE and LOMCE group is shown in Table 1. It shows a higher academic performance in 2017-18 than in 2014-15, with an increase in the success rate of 21%. This increase is also reflected in the distribution of grades obtained, with the highest grades almost doubling.

Therefore, the best results, in general, were obtained with the group of students who attended the pre-university stage with the LOMCE. This cannot be attributed to a greater number of compulsory hours taken in Physics and Chemistry with the LOMCE during the first year of the baccalaureate, since the students in 2014-15 also took this subject, although by choice, not because it was compulsory. However, it could be due to the hours taken in the second year of the baccalaureate, not because it was mandatory, but by choice. And, although the choice of the Physics subject, in both groups, was a minority, the LOMCE group reached higher percentages. On the other hand, undoubtedly, the

In addition, the greater fluency in mathematical calculation observed in the LOMCE group is undoubtedly due to the increase in the number of compulsory hours taken in Mathematics. In addition, this skill could have contributed to the learning process

of the subject Physics, whose knowledge and skills are closely related to Mathematics.

## CONCLUSIONS

University autonomy distances the system from the ups and downs of the political landscape, but, without a doubt, it also isolates it from the rest of the educational system. This work shows that educational reforms, however small or superfluous they may seem, affect education as a whole, regardless of the stage

at which they are addressed. Education must be considered, at all times, as a continuous and lasting teaching-learning process, where the government must ensure its quality and equivalence, for all regardless of the territory in which it is studied. For this, it would be essential to achieve a state pact, as coveted as it is complicated, taking into account that political stability is increasingly difficult to achieve, taking into account that the political range is increasingly extensive.

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