

Article

Satisfaction Level of Engineering Students in Face-to-Face and Online Modalities under COVID-19—Case: School of Engineering of the University of León, Spain

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Abstract: University education in times of COVID-19 was forced to seek alternative teaching/learning methods to the traditional ones, having to abruptly migrate to the online modality, changes that have repercussions on student satisfaction. That is why this study aims to compare the level of student satisfaction in face-to-face and “forced” online modalities under COVID-19. A quantitative, cross-sectional methodology was applied to two groups of students: Under a face-to-face modality ($n = 116$) and under an online modality ($n = 120$), to which a questionnaire was applied under a Likert scale, with four dimensions: Course design structure, content, resources, and instructor. Non-parametric statistics, specifically the Mann–Whitney U-test, were used to compare the groups. The results showed that there are significant differences in the level of satisfaction of students in the face-to-face and online “forced” modalities ($p = 0.01984 < 0.05$), and the dimensions of the level of satisfaction that presented significant differences were course design structure ($p = 0.04523 < 0.05$) and content ($p = 0.00841 < 0.05$). The research shows that students in the face-to-face modality express a higher level of satisfaction, which is reflected in the dimension design structure of the course, specifically in its workload indicator, as well as in the dimension content, in its indicators, overlapping with other courses and materials.

Keywords: university education; satisfaction; formal learning; online learning; COVID-19; quantitative analysis



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1. Introduction

The social changes brought about by COVID-19 began to be felt globally in the first months of 2020. The morbidity and mortality rates associated with the virus and the official declaration of a pandemic transformed the reality known until then into a “new normality”, as it has been called. Many cities were paralyzed, with mobility, economic, educational, and recreational activities being almost non-existent. These actions sought to control the number of contagions. Measures were even taken in a forced manner, despite the fact that the trajectory of the virus and the speed of transmission did not prevent contagion [1,2]. Governments around the world found it necessary to subject the population to restrictions, quarantines, prolonged confinement, curfews, and the closure of inter-and intra-country borders, and because of this, many aspects of daily life have been forgotten. Spain did not escape this reality, and on 14 March 2020, the Spanish government decreed a state of alarm, with confinement measures that were tightened on 29 March, measures that paralyzed ‘non-essential’ activity and, consequently, a large part of the country’s economy [3].

Most governments were forced to close educational institutions indefinitely to prevent the spread of COVID-19 [4]. Therefore, in order to give continuity to the teaching/learning

processes, UNESCO [5] recommended the use of information and communication technologies (ICT) as the main tool for the development of educational activities at all levels. In this sense, the Spanish government established containment measures in the educational field, suspending all educational activities at all levels of education, including university education. In addition, it established that during the suspension period, educational activities should be carried out under distance and online modalities [3].

Thus, at the end of June 2020, approximately one billion students witnessed and were affected by the closure of their schools, colleges, and universities due to the coronavirus outbreak [6], which led to a change in the teaching/learning processes from the face-to-face modality to the application of online teaching/learning. To ensure the continuity of educational activities, a variety of technological tools were used for the interaction of teachers and students [7], among which instant messaging such as Telegram, WhatsApp, and platforms for meetings stand out, in addition to emails that were traditionally used for the exchange of information. However, the transition from face-to-face to virtual classes implied the adaptation of courses, as well as significant changes in methodologies, the use of new strategies and resources, and a complete reprogramming in an accelerated manner. All this was added to the lack of training of some teachers in the preparation of teaching resources and the application of distance or “online” education, as well as difficulties in the use of digital technology, which for many was unknown. Consequently, a great challenge was generated for educators at all levels of Spanish universities, and also for students, when the confinement was imposed in the country in the middle of the second semester.

At the center of these changes in the teaching/learning process are teachers and students, with their intrinsic processes, such as satisfaction and the ways in which they report having acquired knowledge. The degree of satisfaction of students with the education they receive is constantly referred to as a key element in the assessment of the quality of education [8]. This indicates that it is the students who can best value the education they receive, even when they have a partial view of the teaching/learning process.

For this reason, the purpose of this research conducted at the School of Engineering of the University of León is, precisely, to carry out a comparative study of the level of satisfaction of students in the face-to-face and online modalities.

1.1. Teaching/Learning Modalities

In the face of the emergency derived from the COVID-19 pandemic, in general, Spanish universities experienced a rapid evolution in the teaching/learning process, moving from a traditional classroom environment to one that blends traditional and online learning. Moreover, the availability and wide distribution of low-cost devices such as smartphones, computers, and tablets, along with the varied applications available for free such as YouTube, Facebook, WhatsApp, Google Meet, etc., have changed people’s lifestyles, their way of communicating with others, and habits in education [9].

In principle, the presential modality is developed as a face-to-face teaching/learning process in which it is the teacher who transmits knowledge to the students, exchanging concepts and opinions with the students in direct contact. They unify some of the basic characteristics required in the face-to-face modality, such as having knowledge, being the repository of information, the ability to analyze and process information in an orderly manner, and being an instrument of communication [10]. It is necessary to emphasize that, nowadays, the face-to-face modality has incorporated the use of ICT in the teaching/learning process, using resources and carrying out activities in which both the teacher and the student make use of technology.

Globally, structural changes were not far away, and institutions were not only dedicated to developing tools but also to motivating and facilitating a comprehensive understanding of the subjects of interest in order to avoid or reduce dropouts and solve any difficulties that students might have. In Pakistan, for example, the Higher Education Commission (HEC) and Higher Education Department (HED) mandated that all public and private educational institutes should offer online teaching and learning activities un-

til the COVID-19 contagion curve could be flattened [7]. Furthermore, the Universidad Francisco de Vitoria (UFV) in Madrid was able to expedite the switch to emergency remote learning, maintaining regular classes with minimal interruptions or rescheduling, apart from addressing flex-based requirements during the coronavirus quarantine [6]. In Spain, a study involving students at the School of Telecommunications Engineering at the Polytechnic University of Madrid described the changes experienced due to the pandemic condition (COVID-19), exploring the potential impact of educational decisions, such as (1) synchronization in online communication, (2) the number of students, and (3) digital technologies used, on the academic results of students participating in 43 undergraduate courses compared to the results of the last two academic years to establish possible differences in the performance of students enrolled in courses taught with emergency remote teaching and traditional face-to-face courses, finding no significant differences [11].

In this sense, teachers had to make an abrupt transition from face-to-face teaching to online teaching, understood as the teaching/learning process, where the teacher and students participate in a digital environment using ICT, which allows them, through the use of the Internet, to develop a synchronous or asynchronous connection through laptops, smartphones, and tablets.

In this sense, “we will face new teaching-learning models in which technologies will not have a complementary role but a determining role, and where online teaching will be seen with different eyes by students and teachers” [11,12]. This leads to a change in the structure of university education and the way of teaching, and all of this is a consequence of the COVID-19 pandemic. Although the concept of online learning is not new, especially after the popularity and success of Massive Open Online Courses (MOOCs), such as Coursera, EdX, and Udemy, among others, they have never before been used as a primary means of teaching. Teachers had to face four major challenges of online education, such as demonstrating their pedagogical skills in an online classroom, addressing their management role, establishing relationships with students, and providing technical support [13].

1.2. Context of Education in Spain and at the University of León

In Spain, university education traditionally takes place in the face-to-face modality, and only 15% of undergraduate students are enrolled in public or private universities that offer distance education. Distance education, in addition to being supported by the development of technological platforms and devices, is consolidated in the design and planning of training routes or online educational experiences [14]. The declaration of the state of alarm in Spain, together with the enforcement of the total confinement decreed by the national authorities (RD 463/2020) in an attempt to control the spread of the virus, forced Spanish educational institutions to adopt the online modality as a matter of urgency [15,16].

The University of León is a public institution located in the city of León, Spain. It has nine faculties, three schools, an attached private center, a language center, and an ICT center, in which several undergraduate and graduate degrees are taught. Specifically, in the School of Engineering, prior to the pandemic situation, teaching/learning activities were based on (1) theoretical lectures and practical classes, (2) practices using ICT in a computer classroom, and (3) support through available resources that were shared on the institution’s Moodle platform. Attendance was mandatory for most of the activities, so it could be considered a full face-to-face education.

All this changed with the pandemic, migrating, at first, exclusively to the online modality through the university’s own platform, which became supersaturated due to the strong demand, and Google Meet was also used. In addition to live classes, video tutorials, recorded classes, practices, and complementary readings, among others, were used. In addition, a design was employed for the application of online exams, and the professors developed protocols to minimize plagiarism. Despite the apparent success of the situation and the achievements obtained, it is necessary to validate or monitor the teaching/learning process, especially if we take into consideration the disruption in the

activities and the abrupt change in this process, also taking into consideration the nature of the undergraduate and graduate courses taught at the School of Engineering. Specifically, the environment of this research comprises the careers of Electrical Engineering, Industrial Electronics and Automation Engineering, Mechanical Engineering, Energy Engineering, Mining Engineering, and Aerospace Engineering at the undergraduate level, and post-graduate degrees at the master's level in Mining Engineering and Energy Resources and Industrial Engineering.

1.3. Student Satisfaction

Student satisfaction with the teaching/learning process depends on their expectations, and these vary according to the type of course. Satisfaction, in some cases, refers to the needs that, as individuals, are experienced by the organization's personnel; in others, to the adequate response to the expectations, interests, needs, and demands of the recipients [17]. In the particular case of the educational field, the addressees are the students, and their satisfaction is related to the way in which the educational process and the institution itself attend to the expectations, interests, and needs of this particular group [7]. Student satisfaction is a fundamental element in the evaluation of the educational process and reflects the efficiency of this process in relation to the interaction with the teacher, their satisfaction with the contents and resources, as well as with the structure of the course.

1.4. Research Problem

UNESCO [5] recommends the use of online learning programs and open educational applications during the closure of educational institutions caused by COVID-19, for teachers to use them in the teaching/learning process and limit the disruption of education. For this reason, educational institutions, including universities, opt for online classes [18]. In contrast to the face-to-face modality, teachers are researching ways in which the online modality can produce better academic results and achievements.

In that sense, comparative studies have been conducted to explore whether face-to-face or traditional teaching methods are more productive or whether online learning is better [19,20]. These studies reflect those students performing much better in the online modality than in the face-to-face modality. Henriksen [21] highlighted the problems faced by educators when moving from face-to-face to the online modality. In addition, both teachers and students face multiple obstacles to online learning, such as Internet access and unfamiliarity with the platforms used for the teaching/learning process, among others [22].

On the other hand, some researchers have emphasized the need to study the satisfaction level of students under the online mode [23–25]. However, little literature is available on the factors affecting students' satisfaction levels in online classes during the COVID-19 pandemic [26].

Now, the primary interest of this research is the level of student enjoyment, specifically contrasting face-to-face and online modalities. Under this perspective, and because of the above, this research provides an answer to the following question:

Are there significant differences in the level of student satisfaction in the face-to-face and online "forced" modality under COVID-19?

In order to answer this question, the researchers set the following research objective:

To compare the level of student satisfaction in face-to-face and "forced" online modalities under COVID-19.

All of the above leads to concretizing the objective of the research by establishing the study hypothesis.

Hypothesis 1 (H1). *The level of satisfaction of students in the face-to-face modality differs significantly from that of students in the "forced" online modality.*

2. Materials and Methods

We understand the method as the systematic process to be followed to collect and process the information necessary to answer the questions of a given study. This research was developed through quantitative research, and since the purpose of the study was to compare the level of satisfaction of two groups of students, a cross-sectional analytical study approach was used, because its research focus is a specific moment in time, and it allows hypothesis testing. In addition, the questions posed imply a numerical measurement and statistical analysis [27].

2.1. Research Context and Participants

The research was carried out at the University of Leon. Specifically in the School of Engineering, in the careers of Electrical Engineering, Industrial Electronics and Automation Engineering, Mechanical Engineering, Energy Engineering, Mining Engineering, Aerospace Engineering at the undergraduate level, and postgraduate at the master's level in Mining Engineering and Energy Resources and Industrial Engineering.

Nine courses were considered for the research approach: (a) Fluid Mechanical Engineering; (b) Cold Engineering; (c) Industrial and Building Systems; (d) Acoustics and Vibrations; (e) Geology; (f) Graphic Expression II; (g) Nuclear Energy; (h) Mineral Processing; and (i) Management of Mineral and Metallurgical Plants of the aforementioned degrees. A non-probabilistic intentional sampling was applied, and two samples of students were selected for the two modalities; in the face-to-face modality, the sample was composed of 116 students (group 1) and that of the online modality was composed of 120 students (group 2).

2.2. Instrument

The instrument used corresponds to an adaptation of the questionnaire proposed and validated by Pastor [28]. This questionnaire consists of 14 questions under a Likert-type scale of 5 values (1. Totally disagree, 2. Disagree, 3. Indifferent, 4. Agree, 5. Totally agree) and includes 4 dimensions with their respective indicators, as shown in the variables map (Table 1).

Table 1. Satisfaction level and its dimensions.

Variable	Dimension	Indicators	Item
Level of satisfaction	Course design structure	Workload	1
		Content of the subject	2
		Previous courses	3
	Content	Overlap with other courses	4
		Materials	5
		Teaching resources	6
	Resources	Access to bibliography	7
		Class distribution	8
	Instructor	Explanation of the subject	9
		Audiovisual resources and media	11
		Knowledge of the subject	10
		Motivates the class	12
		Communication	13
		Teacher accessibility	14

Figure 1 shows the percentage distribution of the items according to the dimensions of the instrument.

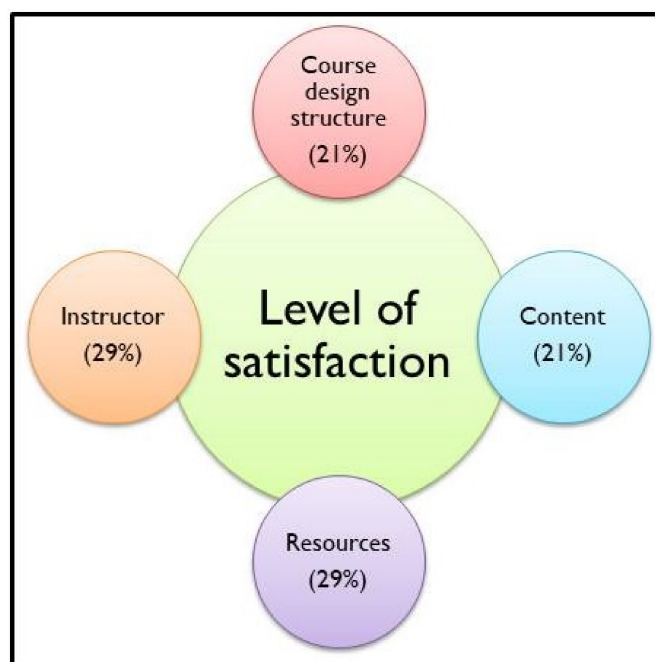


Figure 1. Distribution of the items according to the dimensions.

For the application of the instrument, the students gave informed consent after being duly notified of the objectives of the study and the confidentiality of the study, which is under strict compliance with the ethical norms of the Research Committee and the Helsinki Declaration of 1975.

For the reliability of the instrument, the internal consistency analysis was applied by means of Cronbach's Alpha [29] performed using the IBM SPSS 25 statistical program, which resulted in $\alpha = 0.92$, reliability considered "excellent" according to that established by George and Mallery [30], which validates that the instrument measures the dimensions to be measured with a high degree of certainty.

2.3. Data Analysis

Non-parametric statistics were used, specifically, the Mann–Whitney U test since the student satisfaction level variable has an ordinal scale. The Mann–Whitney U test allows testing for differences between independent groups with scales varying [31]. This test allowed us to know if there are significant differences in the level of student satisfaction in the face-to-face and "forced" online modalities under COVID-19, and a significance level of 0.05 was established. The data were analyzed using IBM SPSS 25.

3. Results

3.1. Analysis of Student Satisfaction Level

First, the Mann–Whitney U test was applied to compare the level of student satisfaction in the "forced" face-to-face and online modalities under COVID-19. We posed the following hypotheses:

Hypothesis 2 (H2). *There are no significant differences in the level of student satisfaction in face-to-face and "forced" online modalities.*

Hypothesis 3 (H3). *There are significant differences in the level of student satisfaction in the "forced" face-to-face and online modalities.*

According to the results presented in Table 2, the rejection of the null hypothesis (H0) is confirmed, since the probability of the error is below the established significance level

$p = 0.019847 < 0.05$. Therefore, it can be confirmed that there are statistically significant differences in the level of satisfaction of both groups of students. When observing the value of the average range, it can be pointed out that there is a higher level of satisfaction in the group of students of the face-to-face modality with respect to the “forced” online one.

Table 2. Mann–Whitney U test statistics for student satisfaction level.

Groups	N	Average Range	Sum of Ranges
Presential	116	129.02	14,966.50
Online	120	108.33	12,999.50
Test statistics			
Mann-Whitney U test			5739.50
Z			−2.329
Asymptotic sig. (bilateral) (p)			0.019847
$p < 0.05$ rejection of the null hypothesis			

3.2. Analysis of the Level of Satisfaction According to the Dimensions: Course Design Structure, Content, Resources, and Instructor

The results show (Table 3) that for the dimensions of resources and the instructor, the null hypothesis is accepted. No statistically significant differences are observed in the resources dimension since the probability of error is above the established significance level $p = 0.08234 > 0.05$. Something similar occurs with the instructor dimension, with a probability of error above the established significance level $p = 0.061732 > 0.05$.

Table 3. Mann-Whitney U-test statistics for the dimensions of student satisfaction level.

Dimension	Group	N	Average Range	Sum of Ranges	
Course design structure	Presential	116	127.47	14,787.00	
	Online	120	109.83	13,179.00	
			Test statistics		
			Mann-Whitney U test		5919.00
			Z		−2.003
		Asymptotic sig. (bilateral) (p)		0.045203	
Content	Group	N	Average range	Sum of ranges	
	Presential	116	130.30	15,115.00	
	Online	120	107.09	12,851.00	
			Test statistics		
			Mann-Whitney U test		5591.00
		Z		−2.635	
		Asymptotic sig. (bilateral) (p)		0.008411	
Resources	Group	N	Average range	Sum of ranges	
	Presential		126.36	14,657.50	
	Online		110.90	13,308.50	
			Test statistics		
			Mann-Whitney U test		6048.50
		Z		−1.749	
		Asymptotic sig. (bilateral) (p)		0.08234	
Instructor	Group	N	Average range	Sum of ranges	
	Presential		126.86	14,716.00	
	Online		110.42	13,250.00	
			Test statistics		
			Mann-Whitney U test		5990.00
		Z		13,250.00	
		Asymptotic sig. (bilateral) (p)		0.061732	
$p < 0.05$ rejection of the null hypothesis					

Regarding the dimensions course design structure and content, the results indicate the rejection of the null hypothesis. Statistically significant differences were found in the

level of student satisfaction in the face-to-face and online groups, which is reflected in the significance values for each dimension.

For the course content structure dimension, a probability of error below the established significance level $p = 0.04523 < 0.05$ was observed. This indicates that there are statistically significant differences between the medians of the groups, and it can be pointed out that there is a higher level of satisfaction in the group of students of the face-to-face modality with respect to the “forced” online modality, obtaining an average range value of 127.47 higher than that of the online modality of 109.83. These significant differences are specifically reflected in the behavior of the workload indicator (Table 4) where the face-to-face modality presents a median of 4, higher than the median of the online modality, indicating the level of satisfaction of the students of the online modality is higher.

Table 4. Median of indicators according to dimension.

Dimension	Indicators	Presential	Online
Course design structure	Workload	4	3
	Content of the subject	4	4
	Previous courses	4	4
Content	Overlap with other courses	5	4
	Materials	4	3.5
	Teaching resources	4	4
Resources	Access to bibliography	4	4
	Class distribution	4	4
	Explanation of the subject	4	4
	Knowledge of the subject	4	4
Instructor	Audiovisual resources and media	5	5
	Motivates the class	4	4
	Communication	4	4
	Teacher accessibility	5	5

Something similar occurs with the content dimension, where a probability of error below the established significance level $p = 0.008411 < 0.05$ was observed (Table 3). This indicates that there are statistically significant differences between the medians of the groups, obtaining a higher level of satisfaction with the dimension in the group of students of the face-to-face modality, obtaining an average range value of 130.3, higher than the online modality range of 107.09. These significant differences are specifically reflected in the behavior of the indicators overlapping with other courses and materials (Table 4) where the students of the face-to-face modality express a higher level of satisfaction. In the case of the course preference indicator, it presents a median of 5, higher than the median of the online modality. Similar behavior is observed in the materials indicator, where the face-to-face modality obtained a median of 4, higher than the median of the online modality.

The confinement decreed by the Spanish government on 15 March 2020 coincided with the start of the second university semester and came as a real shock, both for students and the teaching work of professors, who had to adapt in record time to the new circumstances dictated by the pandemic.

The impact on teaching was uneven and was marked by a number of factors, including the technological competence of the teaching staff, the nature of the subjects involved, access to mobile devices connected to the internet, and the university’s communications infrastructure. Fortunately, the last two factors did not play a major role. The University of León is equipped with a very modern fiber optic intranet and, for years, teachers and students have had access to it from the outside to run different administrative and teaching

tools. On the other hand, access to mobile devices and high-bandwidth internet by students is widespread (97% of students). In addition, the Rector's Office set up a system for lending computers with eSim cards for those students who have difficulties accessing them at home.

The more experimental subjects, with more practical content, were the most difficult to teach during confinement. Worthy of mention is the case of the Graphic Expression II subjects included in this study. The thematic block on the representation of mechanical assemblies was undoubtedly the most problematic when teaching the classes by video-conference, as the students did not have material access to the mechanisms, which was a burden on their understanding. The teachers made a great effort to finalize the programming of a mobile application, based on Augmented Reality, and adapt it to the new pandemic circumstances so that the students could work on the competences on mechanisms included in the syllabus of the subject. The use of the app was an important aid and has been highly valued by the students, as well as having a positive influence on learning [32]. This academic year, 2022–2023, is the third year that the app is being used, and the experience has been awarded the Prize for Innovation in Teaching 2022, awarded unanimously by the Social Council of the University of León.

4. Conclusions

Virtual education was adopted as a solution to the disruptive situation that arose due to the COVID-19 pandemic and, although it has been a successful solution in many cases, it should be evaluated in order to make the corresponding adjustments to ensure a quality teaching/learning process, and also motivate participants to continue training under this new concept.

This is reflected in the results obtained in this research, where when comparing the level of satisfaction of the students in the face-to-face and “forced” online modalities, it can be affirmed that the students of the face-to-face modality, in general, express a higher level of satisfaction. This indicates that the teaching/learning modality matters as much as other factors that can influence the teaching/learning process. The level of student satisfaction should be used to suggest a number of positions for effective online learning [33].

In view of the fact that the teaching/learning process is conditioned by the level of digital competencies of both teachers and students, it is necessary to train university teachers to design structures, contents, and resources that are applicable to online teaching. In this case, the University of León must take up the challenge to definitively face the changes and be prepared for the implementation of a hybrid or exclusively online model if necessary.

Virtual education was the response to the continuity of teaching/learning processes in the face of the pandemic in the world, and while students are able to identify the usefulness of digital tools and learning platforms, the face-to-face experience is considered more satisfactory [34].

Providing students with a course content structure for the development of an adequate teaching/learning process is important for educational quality. The choice of course content structure has implications for the work of teachers and students. In that sense, the results of this study indicate that students under the online modality were less satisfied with the structure of the course content compared to students under the face-to-face modality. This is due to the fact that they consider that in the online modality, the amount of work is excessive, even though they are keeping up with it, and they also consider that the professor did not adequately adapt the course for the online modality. This work overload may be caused by (1) the concern of teachers to complete the course on time, (2) the content of the programs not being adjusted to the online modality, as they remain static, (3) the lack of experience of teachers and students in the online teaching/learning process, and (4) the multiplicity of learning platforms faced by students [35]. In particular, the structure of online course content requires great flexibility and accessibility in terms of the workload, course content, and linkages with previous courses, in order to favor the teaching/learning

process. In this regard, some of the reasons behind differences between face-to-face and online classes could be due to the fact that the characteristics of the assignments, the content, and specificity of the course, the students' characteristics, the students' motivation, and the instructor's characteristics were not taken into account [36,37].

The COVID-19 crisis has forced the use of new technologies and hasty preparation on the part of teachers, which leads to planning not previously thought out for teaching courses in the online modality. Online teaching not only consists of digitizing contents, replacing the hour of face-to-face class in the classroom with another hour of virtual class, but also the appropriate teaching materials and resources for the class must be considered. In this sense, the results indicate that the students expressed a low level of satisfaction in reference to the teaching materials and resources used in the online modality with respect to the face-to-face one. They indicated that in the virtual classes, the notes and support material, as well as the videos and teaching resources, were scarce and very poor, and the classes became very tedious and demotivating. Mediation, the accompaniment provided by the tutor, and the interaction with other participants lose their effect if the materials used do not respond to the characteristics of the virtual environment. It is these materials that determine the interest and progress of the participants [38]. Online education can be an equally effective teaching format when the online course is designed using the appropriate materials, resources, and pedagogy [39].

This low level of satisfaction with the materials and resources could indicate that there is a need to review the contents and resources used to impart knowledge, which requires greater attention when it comes to distance education because one should not lose sight of the fact that all activities designed virtually should efficiently stimulate the construction of knowledge [38].

On the other hand, with regard to resources and instructor dimensions, even when students of both types of modalities were equally satisfied, it should be emphasized that they expressed a lack of motivation on the part of the professor, classes that were not very dynamic and attractive, failures in communication, and the response of the professor when students try to communicate their doubts and concerns. It is difficult to overcome the traditional pedagogy of lecture classes and adapt to contemporary ideas of a model rich in interactions using online technology [40].

This leads to the importance of carrying out concrete actions to review and update curricula and degree profiles, updating programs for teachers, the standardization of teaching/learning methodologies, and the organization of teachers. In view of the fact that the process is conditioned by the level of digital competencies of both teachers and students, it is necessary to train university teachers to design structures, content, and resources that are applicable to online teaching. In this case, universities must take up the challenge to definitively face the changes and be prepared for the implementation of a hybrid or exclusively online model if necessary.

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Data Availability Statement: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request: Rebeca Martínez-García (rmartg@unileon.es).

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