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Generic competences and learning results during the COVID-19 pandemic: a comparative study

Competencias genéricas y resultados de aprendizaje durante la pandemia del COVID-19: un estudio comparativo

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ABSTRACT. The paper has a dual aim: first, to study the effect the COVID-19 pandemic has had on the development of students' generic competences and learning outcomes; and second, to analyse the observed differences between these two elements depending on whether the students' teaching-learning environment of origin was face-to-face or online. To analyse the effect the pandemic has had, data were collected on the students enrolled in two universities with different methodologies, one face-to-face and one online. A descriptive analysis and comparison of means were carried out using questionnaires designed to collect information on students' perception of the effect of the pandemic on their generic competences and learning results, depending on the environment of origin. The results confirm that the pandemic has affected the development of students' generic competences, despite students themselves considering that they have met their learning objectives. Furthermore, the teaching-learning environment of origin influences both variables, with differences observed between face-to-face and online university students.

RESUMEN. El artículo tiene un doble objetivo: en primer lugar, estudiar el efecto que la pandemia del COVID-19 ha tenido en el desarrollo de las competencias genéricas y los resultados de aprendizaje de los estudiantes; y en segundo lugar, analizar las diferencias observadas entre estos dos elementos dependiendo de si el entorno de enseñanza-aprendizaje de los estudiantes fue presencial o en línea. Para analizar el efecto que ha tenido la pandemia, se recopilaron datos sobre los estudiantes inscritos en dos universidades con diferentes metodologías, una presencial y otra en línea. Se llevó a cabo un análisis descriptivo y una comparación de las medias utilizando cuestionarios diseñados para recopilar información sobre la percepción de los estudiantes del efecto de la pandemia sobre las competencias genéricas y los resultados de aprendizaje, dependiendo del entorno de origen. Los resultados confirman que la pandemia ha afectado al desarrollo de las competencias genéricas de los estudiantes, a pesar de que los propios estudiantes consideran que han cumplido sus objetivos de aprendizaje. Además, el entorno de enseñanza y aprendizaje de origen influye en ambas variables, con diferencias observadas entre los estudiantes universitarios presenciales y en línea.

KEYWORDS: Generic competences, Learning results, Higher education, Emergency remote teaching, Online teaching.

PALABRAS CLAVE: Competencias genéricas, Resultados de aprendizaje, Educación superior, Enseñanza remota de emergencia, Enseñanza en línea.

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1. Introduction

SARS-CoV-2 has caused a global pandemic of the COVID-19 disease, which has generated an unprecedented crisis in all socioeconomic areas, including education. To contain COVID-19, the governments imposed strict epidemiological restrictions. At the end of March 2020, the governments of the majority of European countries decided to lock down the population and countries closed their borders in response to these lockdown measures.

The lockdowns in response to COVID-19 interrupted face-to-face education with the closure of schools, colleges and universities in most countries around the world (UNESCO, 2020), posing a threat to the achievement of the fourth Sustainable Development Goal (SDG) of the United Nations, quality education (United Nations, 2019). COVID-19 has had a devastating effect on educational activity (Daniel, 2020), which could have some very damaging consequences for future generations.

The report on the impact of COVID-19 on education (Schleicher, 2020) states that while the educational community has made concerted efforts to maintain the continuity of learning during this period, students have had to rely more on their own resources to continue distance learning. For their part, teachers have had to adapt to new pedagogical concepts and ways of teaching that they have likely had no training in (Al-Kumain et al., 2021).

This interruption not only led to changes in the higher education area (Iglesias-Pradas et al., 2021), but seriously affected students' learning experiences (Grant & Gedeon 2020). Given that the face-to-face teaching and learning modes were unviable, a new emergency e-learning era emerged (Müller et al., 2021). The virtualisation of different procedures in the universities was both forced and accelerated without warning by the COVID-19 pandemic, even though the virtualisation of face-to-face learning procedures is not an easy task (Alabariat et al., 2021).

Around the world, face-to-face universities had to make the transition from using classic teaching techniques to implementing remote emergency teaching in just a few days, with virtual platforms suddenly becoming the focus of interaction between teachers and students (Infante-Moro et al., 2022a). The COVID-19 pandemic altered the face-to-face teaching models, even involving learning via social media (Lemay & Doleck, 2020) and giving way to online teaching and learning activities (García-Peñalvo et al., 2021; Infante-Moro et al., 2021a; Lemay et al., 2021). This sudden transition was implemented in the absence of sufficient available information on how to quickly apply new methodologies and their possible effects on the quality of education. Prior research into online teaching and learning has shown that transitions are generally voluntary and planned. However, little is known about emergency transitions like those caused by COVID-19 (Lemay et al., 2021).

The online universities had a clear advantage in this exceptional situation since their procedures linked to teaching and learning were already online (Cranfield et al., 2021). The IAU Global Survey Report (Marinoni et al., 2020) stated that COVID-19 affected teaching and learning in almost all HEIs, with only 2% of HEIs reporting that teaching and learning was not affected, notably mostly virtual universities.

Despite this supposed advantage, we do not have enough information on whether students' academic performance in face-to-face universities was affected more than that of online university students, who were supposedly already fully adapted to an entirely remote teaching and learning system.

Throughout the crisis, researchers have sought to better understand the effects the pandemic has had on students. Various works have contributed by analysing the effect of virtualisation on face-to-face university students, leaving aside the effect the pandemic may have had on online university students' learning. Notably, the analyses made until now have focused on students' academic performance basically in terms of qualifications. However, and despite the crucial role competences have in the learning process (González &

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Wagenaar, 2006) and in the creation of links in the labour market (Sánchez-Rebull et al., 2011), in addition to the link between these and the results of the learning process (Fitó-Bertran et al., 2015; Ferreras-Garcia et al., 2021a; Hernández-Lara & Serradell-López, 2018), there are as yet no analyses on the effect the pandemic may have had on these two elements.

Thus, it is not clear how the pandemic has influenced students' academic performance in terms of competences and learning results, and not only of students who have had to make an enforced transition to remote teaching, but also of those who were studying in an online university.

The present research makes an important and original contribution to the previous literature, introducing these analyses and considering new aspects that have not been covered by previous researchers.

2. Literature review

2.1. From face-to-face to online learning

The COVID-19 pandemic has had a huge impact at all socioeconomic levels and education has been no exception. The new reality, with the declaration of the state of emergency and the lockdown of the population, forced all face-to-face universities to change to online teaching, thus affecting most of the university population.

In Spain, the effect in quantitative terms was huge because approximately one in three young people aged 18 to 24 years are enrolled on a university course, with most opting for the face-to-face mode, while the non-face-to-face universities cater for a smaller volume of students, specifically 16% of the total (Ministry of Universities, 2021).

Nonetheless, this virtual learning environment is not new; it has existed for some years and it is implemented by different universities. Virtual learning is generally defined as different forms of learning using information and communication technologies (ITC) and it has numerous advantages, including giving students more autonomy in their learning and facilitating interaction between teachers and students with no restrictions on when or where this is produced (Barker, 2002; Benito, 2009; Sun et al., 2008).

When the state of emergency began, the face-to-face universities suddenly found themselves in direct competition with the online universities without having the infrastructure or the support services needed to cope with the change in teaching (Grant and Gedeon, 2020). The COVID-19 pandemic caused an enormous interruption in the way in which the face-to-face higher education institutions taught their courses, moving to remote teaching from one day to the next. This change due to the emergency situation came about suddenly and was unplanned, forcing them to change teaching methods and resources to adapt them to remote learning.

As pointed out by Iglesias-Pradas et al. (2021), experts have argued that the teaching offered in the digital spaces that have come about due to COVID-19 cannot be considered online learning, leading to the emergence of a new concept: emergency remote learning (Rapanta et al., 2020). This online learning is characterised by being a temporary change to an alternative remote teaching mode due to a crisis situation, with the word 'temporary' being key because once the crisis situation is over the learning will go back to its original format.

The online universities and the universities that were leaning towards virtualisation before the pandemic responded well, adapting quickly to the sudden change, while the universities with little or no experience with virtualisation faced difficulties to migrate to digital platforms and to carry on the learning process (Tang et al., 2021). Research into this sudden paradigm shift and the effects on students' academic performance is an aspect in process of study.

2.2. The pandemic and students' learning

The change of teaching-learning model caused by the COVID-19 pandemic at universities hugely affected

those at the heart of the model, the students. They not only had to change to a new learning mode, but they also had to cope with many other factors that influenced their learning experience (Grant & Gedeon, 2020).

The students of the face-to-face universities faced difficulties and challenges to adapt to the abrupt and unplanned change to online learning. They underwent changes in both their study procedures and individual learning, having to learn new ITC skills (Gradišek & Polak, 2021) and reporting increased stress, anxiety, fatigue and difficulties with concentration (Lemay et al., 2021; Mocanu et al., 2021). Their engagement was also enormously affected (Khlaif et al., 2021), as was their social and academic integration (Adnan & Anwar, 2020; Gradišek & Polak, 2021).

There is a growing interest in understanding and investigating the impact of the COVID-19 pandemic on higher education students. The elevated number of works in this area are varied in the topics they cover. By way of example, among the topics analysed in the available research are students' transition to online learning in higher education during the COVID-19 pandemic (Adnan & Anwar, 2020; Lemay et al., 2021; Infante-Moro et al., 2021b, 2022b); students' perspectives and perceptions of emergency remote teaching and learning (Baranova et al., 2021; Cranfield et al., 2021; Mocanu et al., 2021; Selco & Habbak, 2021); learning experiences (Zhou & Zhang, 2021); satisfaction with the quality of online learning (Jiménez-Bucarey et al., 2021; Ramírez-Hurtado et al., 2021); and students' academic performance during this emergency situation (El Said, 2021; Iglesias-Pradas et al., 2021).

In relation to this last topic, there are a large number of works that study the effect of the emergency e-learning situation on students' academic performance. In their study on the transition to online learning, Lemay et al. (2021) show that students' generally reported positive academic results, although they also reported increased stress, anxiety and difficulties with concentration; Adnan and Anwar (2020) highlight that online learning cannot produce the desired results in underdeveloped countries where a vast majority of students are unable to access the internet due to technical and monetary issues; Iglesias-Pradas et al. (2021) show that students increased their academic performance and that organisational factors contribute to a successful implementation of emergency remote teaching; El Said (2021) obtained similar results in their comparative study on business students who completed a face-to-face course in spring 2019 and students who completed the same course but fully online via distance learning mode during lockdown in spring 2020, showing that there was no statistically significant difference in students' grades; Prat et al. (2021) analyse the effect taking into account the university's online teaching activity from virtual platform indicators, showing that there was an improvement in performance indicators; and Alarabiat et al. (2021) used the process virtualisation theory to investigate the impact of the virtualisation needs of the learning process on students' satisfaction and their intention to continue using online learning.

With the implementation of EHEA, competencies became part of the study plans of the European universities and are now a fundamental part of the teaching-learning process.

In 2008, the Tuning Project (González & Wagenaar, 2006) compiled a list of generic competences needed for students to become competent individuals. Generic competences are the ones that are interdisciplinary in nature and common to all degree programs. They were widely analysed in studies prior to the pandemic (Chan et al., 2017; Ferreras-Garcia et al., 2021b; Okolie et al., 2020; Suleman, 2018; Williams, 2019), but to our knowledge no previous work has explicitly analysed the effect the pandemic has had on students' generic competences.

Clearly, the change in teaching and learning mode due to the COVID-19 pandemic may have affected students' acquisition of competences. Nonetheless, we have no knowledge about this possible effect. Among the few studies related to competences, we find Lāma and Lāma (2020), who study students' collaborative competences; Slišāne et al. (2021), who focus on the teacher educating student's on entrepreneurial competence in the remote study process; Gradišek and Polak (2021), who show that the adapted teaching and learning methods and tasks contributed positively to the development of competences related to online exams;

and García-Peñalvo et al. (2021), who concluded that during the emergency e-learning period, most of the competences could be evaluated thanks to the institutional technological ecosystems of the universities and the collective effort of the whole university community. However, none of these works has analysed the effect on the students' global competence level.

By the other hand, previous works have shown the connection between students' acquiring competences and the results of the learning process. For example, Fitó-Bertran et al. (2015) and Ferreras-Garcia et al. (2021a) confirm that generic competences influence the different learning results; and Hernández-Lara and Serradell-López (2018) highlight that some skills are more connected with learning results than others when different dimensions of learning are considered.

Despite the high number of studies on emergency remote online education in higher education institutions caused by COVID-19 and the impact on students, there are currently unexplored aspects and the knowledge we have about student preparation for online learning in real time is extremely scarce (Tang et al., 2021).

Additionally, and as has been observed, the different works conducted until now have analysed the effect of the pandemic on students' academic performance, with few focusing on competences and the results of the learning process. Other studies have analysed the effects the change of model has had on face-to-face university students, but no previous studies have analysed the effect the crisis has had on distance university students. It has been assumed that online university students have not been affected in terms of their learning experience or their learning results, but empirical results are needed to prove or disprove this assumption. Furthermore, there are no comparative studies at all on the two types of students.

The variability of the observed results and the lack of studies justify the need for more empirical evidence to improve our understanding of the impact of the teaching format on students' competence results.

2.3. Research focus

Considering these nuances, the question arises as to what impact the COVID-19 pandemic has had on the development of generic competences and students' results of the learning process.

This first objective leads to two research questions:

RQ1: How do students perceive that the COVID-19 pandemic has affected the development of their generic competences?
RQ2: How do students perceive that the COVID-19 pandemic has affected their learning process results?
The second objective refers to the analysis of whether the effect of the pandemic on the development of generic competences and students' learning results differs depending on students' initial teaching-learning method. To this effect, we compare a face-to-face university and an online university.
The second objective leads to the following research questions:
RQ3: Are there any differences in the level of effect on students' generic competences between the on campus courses given by emergency remote learning and the online courses?
RQ4: Are there any differences in the level of effect on students' learning process results between the on campus courses given by emergency remote learning and the online courses?

This analysis enables us to know the point to which the pandemic has affected students' learning experiences and to implement actions to improve future possible effects of future emergency remote teaching situations.

3. Methodology

3.1. Data collection

This study attempts to identify the perception of the effect of the pandemic on the development of students' generic competences and learning process results. To achieve this aim, the study analyses the effects on campus based students and online students.

To measure this effect, data were collected on face-to-face students in their first year at the Faculty of Economics and Business from the X University and on e-learning students from the Y University.

A self-administered questionnaire to collect information on the students from the two universities was designed, a commonly used method in this type of research (Faria & Wellington, 2004). The questionnaires were sent to students by means of a link in the virtual classroom and they were completed anonymously. The students from the two universities did so in January 2021 so that students' opinions could be collected after three months of online teaching activity.

The questionnaire was divided into three blocks. The first block included questions designed to collect information on the characteristics of the sample, such as gender, age and having the technological equipment needed to follow the classes online. This last question was only posed to the face-to-face university students because the online university students necessarily had the required material to be able to develop their academic activity. The second block corresponded to the evaluation of the effect the pandemic had had on their acquisition of the generic competences. The competences were selected from the items included in the white paper of the Bachelor's Degree in Economics and Business Administration (ANECA, 2005). These items were used in previous research focused on the level of generic and specific competences of students enrolled on the Economics and Business Administration and Management degree programmes for the purpose of measuring the effect of the different learning tools, such as business simulators and business plans (Ferreras-Garcia et al., 2019, 2021b; Fitó-Bertran et al., 2015; Hernández-Lara et al., 2018). The questions referring to competences were designed using an ordinal 5-point Likert scale where 1 meant "Very low degree of effect" and 5 meant "Very high degree of effect". The third block included five questions to evaluate the effect the pandemic had had on students' learning process results, more specifically on their academic objectives, the teachers' task, their satisfaction and their expectations. The items were extracted from constructs used previously in research related to the results of the learning process (Buil et al., 2018; Ferreras-Garcia et al., 2021a; Fitó-Bertran et al., 2015; Hernández-Lara & Serradell-López, 2018; Tiwari et al., 2014). All the items of the results were evaluated using an ordinal 5-point Likert scale where 1 corresponded to "Do not agree at all" and 5 to "Totally agree". A total of 207 completed questionnaires were collected.

The generic competences and the results of the learning process are described in Table 1.

	Generic competences
G1	Learning and responsibility
G2	Looking for, identifying, organising and appropriately using the information
G3	Critical, synthesised and global vision analysis
G4	Application of knowledge to practice
G5	Taking decisions in uncertain situations
G6	Adapting to new situations
G7	Working in teams and in networks in multidisciplinary and multicultural environments
G8	Negotiation
G9	Creativity
G10	Entrepreneurship
G11	Innovation
G12	Leadership
G13	Oral and written communication in the native language
G14	Communication in a third language
G15	Interpreting the evolution of the environment and adapting to it
G16	Using information and communication technologies and adapting to new technological environments
G17	Time management in situations of change and uncertainty
G18	Ethical commitment and knowledge of fundamental rights
G19	Selecting and generating the information needed for each problem, analysing it and taking decisions based on this information
G20	Organising and planning work in terms of good timed management
G21	Showing initiative and working autonomously when the situation so requires
	Learning process results
R1	I think I have met my academic objectives despite the pandemic
R2	I think that the teachers have used good tools to keep students learning
R3	I am satisfied with the teaching I received during the pandemic
R4	The learning received has met my expectations
R5	The learning received has surpassed my expectations

Table 1. Variables. Source: Self-made.

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3.2. Data analysis

Statistical analyses were carried out using IBM SPSS Statistics version 25. On analysing the distribution of the variables, the Kolmogorov-Smirnov test led us to reject the null hypothesis at a significance level of $\alpha = 0.05$ and to conclude that the generic competences and learning results variables did not follow a normal distribution.

The first and second research questions were answered by means of a descriptive analysis of the effect on generic competences and results of the learning process. The third and fourth research questions were addressed using the non-parametric Mann-Whitney test to identify the existence of significant differences in the effect of the pandemic on students' generic competences and learning results, comparing two samples (students in the campus based university vs. students in the online university).

A Cronbach's α test (Cronbach, 1942) was used to measure the degree of consistency of the measures. According to De Vellis and Dancer (1991) and general consensus, if the value α is over 0.7 the result is reliable. The result obtained was 0.957 for the set of generic competences and 0.860 for the set of learning results, so we can conclude that the data have a high degree of internal consistency and were reliable.

Table 2 shows the frequency and distribution of the sample in relation to the variable 'Methodology'.

Methodology	Frequency	Percentage
Face-to-face	114	55.1
Online	93	44.9
Total	207	100

Table 2. Distribution by Methodology. Source: Self-made.

The distribution of the students by gender shows that 52.2% were men and 47.8% were women. The average age of the students was 26.21 years, with notable differences between the students from the two universities. The average age of the students at the face-to-face university was 18.91 years with a range between 18 and 32 years, while the average age of the online university students was 35.15 with a range between 18 and 62 years. This is explained by the different typology of students that opt for online learning, who are usually parents with stable jobs, while campus based students are usually young and have just finished secondary school when they start university.

4. Results

4.1. First research objective

Table 3 shows the means and standard deviations of the generic competences and learning results variables. The results show that the students perceive that the pandemic has affected the development of their generic competences, with values above three points in most cases.

The competences most affected by the pandemic were those related to time management (G20, G17), adaptation to new situations, (G6), team work (G7), autonomous work (G21), the use of ICT (G16) and learning and responsibility (G1), followed by applying knowledge to practice (G4) and the adaptation and evolution of the environment (G15), all of them with values above 3.11 points. Meanwhile, the competences they considered least affected by the pandemic were those related to communication (G13 and G14), with values of 2.63 points.

Regarding learning results, the students considered that they had met the academic objectives despite the pandemic; they were satisfied with the teaching received during the state of emergency; they believed that the learning received met their expectations, although it didn't surpass them; and they considered that the teachers had used appropriate tools to maintain student learning.

In summary, the students perceived that the pandemic had affected the development of their generic

competences, although they considered that they had met their learning objectives, possibly thanks to the task and commitment of the teachers.

Variable	*n*	Minimum	Maximum	Mean	Standard deviation
G1	207	1	5	3.19	1.145
G2	207	1	5	2.94	1.225
G3	207	1	5	2.84	1.116
G4	207	1	5	3.13	1.176
G5	207	1	5	3.03	1.232
G6	207	1	5	3.28	1.221
G7	207	1	5	3.24	1.313
G8	207	1	5	2.80	1.260
G9	207	1	5	2.90	1.292
G10	207	1	5	3.03	1.331
G11	207	1	5	2.98	1.252
G12	207	1	5	2.98	1.362
G13	207	1	5	2.63	1.304
G14	207	1	5	2.63	1.308
G15	207	1	5	3.11	1.230
G16	207	1	5	3.19	1.355
G17	207	1	5	3.29	1.219
G18	207	1	5	2.99	1.381
G19	207	1	5	2.98	1.231
G20	207	1	5	3.29	1.248
G21	207	1	5	3.19	1.350
R1	207	1	5	3.72	1.169
R2	207	1	5	3.22	1.104
R3	207	1	5	3.24	1.106
R4	207	1	5	3.23	1.117
R5	207	1	5	2.60	1.202

Table 3. Descriptive statistics of generic competences and learning process results. Source: Self-made.

4.2. Second research objective

If we divide the sample according to the original learning-teaching environment, the results (Table 4) point to a greater effect on the development of competences for online university students, contrary to what may have been expected. These students perceived that 16 of the 21 competences had been somewhat affected by the pandemic, while the face-to-face university students considered that only 10 of them had been affected. Furthermore, the face-to-face university students perceived only 4 of the 21 competences to be more affected than the online students. These were the competences related to time management and autonomous work (G20 and G21), learning and responsibility (G1) and applying knowledge to practice (G4).

Among the competences most affected by the pandemic according to the face-to-face university students were the competences related to time management (G20 i G17), applying knowledge in practice (G4), learning and responsibility (G1) and teamwork (G7). For online university students, the competences most affected by the pandemic were adaptation to new situations (G6), the competences related to time management (G20 and G17) and teamwork (G7).

Notably, despite some competences coinciding, there were clear differences in the competence of applying knowledge to practice, with face-to-face university students considering that they had not been able to apply their knowledge, while online university students perceived this competence to be less affected, possibly because the online teaching methodology already contemplates putting knowledge into practice while the face-to-face universities cover this task in the classrooms.

Notably regarding learning results, the online university students were more satisfied in general with the results achieved, while the face-to-face university students were less happy with the teaching, although they considered that on average they had achieved their academic objectives despite the pandemic. These data may be explained by the drastic change in methodology undergone by the face-to-face university students.

Methodology	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13
Face-to-face	3.25	2.92	2.78	3.27	2.86	3.11	3.18	2.64	2.75	2.86	2.86	2.87	2.48
Online	3.12	2.97	2.90	2.95	3.25	3.48	3.30	3.00	3.09	3.25	3.12	3.12	2.82
Methodology	G14	G15	G16	G17	G18	G19	G20	G21	R1	R2	R3	R4	R5
Face-to-face	2.55	3.08	3.13	3.17	2.89	2.89	3.32	3.20	3.29	2.84	2.81	2.74	2.14
Online	2.72	3.14	3.27	3.43	3.10	3.09	3.25	3.17	4.26	3.84	3.73	3.72	3.17

Table 4. Means of competences and learning process results for the Methodology variable. Source: Self-made.

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The differences in the effect on competences and the effect on learning results among the groups of students was tested by means of the non-parametric Mann-Whitney U test (Table 5). The results show that at a significance level of $\alpha = 0.05$, the competences related to decision making in situations of uncertainty (G5), adaptation to new situations (G6), negotiation (G8) and entrepreneurship (G10), in addition all learning results presented significant average differences depending on the teaching-learning environment.

At a significance level of $\alpha = 0.1$, the application of knowledge to practice (G4), creativity (G9), oral and written communication (G13) and time management in situations of change and uncertainty (G17) also showed significant differences. For all the competences with significant differences (except the application of knowledge to practice), the level of effect on competences perceived by the online university students was higher than that of the face-to-face university students. As previously mentioned, the online university students were more satisfied with their learning results Therefore, it can be affirmed that the online university students were more affected in terms of development of competences and less affected in terms of the achievement of learning results than the face-to-face university students.

	G4	G5	G6	G8	G9	G10	G13	G17
Mann-Whitney *U* test	4502.5	4312	4295	4470	4540.5	4417.5	4575	4584.5
Wilcoxon *W* test	8873.5	10867	10850	11025	11095.5	10972.5	11130	11139.5
Z	-1.925	-2.368	-2.414	-1.987	-1.817	-2.106	-1.737	-1.720
Asymptotic significance (2-sided)	0.054*	0.018**	0.016**	0.047**	0.069*	0.035**	0.082*	0.085*
	R1	R2	R3	R4	R5			
Mann-Whitney *U* test	2790	2793	2917.5	2350.5	2709.5			
Wilcoxon *W* test	9345	9348	9472.5	8905.5	9264.5			
Z	-6.086	-6.069	-5.751	-7.111	-6.236			
Asymptotic significance (2-sided)	0.000**	0.000**	0.000**	0.000**	0.000**			

Significance codes: p-value 0.05 '**'; p-value 0.1 '*'.

Table 5. Significant statistical tests of the competences and learning process results for the Methodology variable. Source: Self-made.

5. Discussion

The main contribution of this study is that it provides an analysis of how the COVID-19 pandemic has affected the development of students' generic competences and the results of the learning process, in addition to a comparison of these effects between students from a face-to-face university and students from an online university.

5.1. First research objective

In global terms, the first conclusion we can draw from the results is that the students perceive that the pandemic has affected their generic competences development, but that it has hardly affected the results of the learning process.

Regarding the effect on the development of generic competences, the lack of previous studies means that we could not make a direct comparison. Nonetheless, our results confirm that the students perceive that the pandemic has affected their development but in different ways depending on the type of competences, with values that oscillate between 3.29 and 2.63 points. The most affected competences are those related to the direct effects of the pandemic on their day-to-day activities, such as time management and adaptation to new situations.

Regarding learning results, and in answer to the question as to whether the pandemic has affected the results of the learning process, we can affirm that the students consider that they have achieved their academia objectives despite the pandemic, with a score of 3.72 points, also positively evaluating the teaching and learning received. This result is partially consistent with previous results in the scientific literature, including Lemay et al. (2021), Iglesias-Pradas et al. (2021) and Prat et al. (2021), who show that students increased their academic performance during the emergency remote teaching. A possible explanation for these results, as Spencer and Temple (2021) affirm, is that despite the pandemic the general perceptions of the online courses were positive because students considered the instruction technologies to be reliable and easy to understand, as well as

reporting that the online technologies provided rapid feedback, improved their problem solving skills and satisfied their learning needs. Another possible explanation for our results could be attributed to the strategies designed and implemented by the universities to cope with the pandemic and the important planning and organisational efforts required (Iglesias et al., 2021), demonstrating that the crisis can be overcome with adequate and opportune measures like the greater involvement of the university and the teachers. Furthermore, the good learning results despite the pandemic could be explained by an improvement in students' learning strategies and their self-regulation skills (González et al., 2020), in addition to accessing to a good remote digital learning environment, which according to Arnou et al. (2020) is key to improving students' online experiences.

5.2. Second research objective

Regarding the type of teaching-learning environment of origin, when we analyse the means of the effect of the pandemic on competences, we obtain that while both face-to-face and online students have been affected in terms of their development, the latter group perceive this effect as greater for the majority of competences. Among the most affected competences according to the online university students are those related to adaptation to new situations and time management. Meanwhile, among the competences most affected according to the face-to-face university students are those related to time management and autonomous work, learning and responsibility and applying knowledge to practice. A possible explanation for these differences could be the influence of the age of the students in the two different types of universities, which could have affected the answers (Cranfield et al., 2021). The face-to-face university students were comparatively younger and so had less family responsibilities, which could have influenced their perception, with independent learning and responsibility particularly affected. Regarding the application of knowledge in practice, as mentioned previously, the face-to-face university students considered that they had not been able to apply them, while the online students perceived this competence as having been less affected, possibly because the online teaching environment already contemplates putting knowledge into practice, while the face-to-face universities do this in the classroom.

Regarding learning results, the averages show that the face-to-face university students perceive that the results of their learning process had been more affected, producing the largest difference in meeting the academic objectives, 3.29 compared to 4.26. These data may be explained by the drastic change in methodology undergone by the face-to-face university students. As affirmed by Iglesias et al. (2021), online teaching stems from careful instructional design and planning, which requires investing in a whole ecosystem of student supports which needs time to construct, while emergency distance teaching is a response to a crisis and involves a temporary change in learning. Therefore, the differences between the courses given as emergency distance teaching and the online courses likely indicate a failed implementation of emergency distance teaching and highlight the need for careful planning when teaching is shifted to online. Another factor that could have influenced the different results is social integration because this aspect is often more important than academic integration for first year face-to-face university students due to the fact that peer support helps them to overcome any initial difficulties in their studies (Gradišek & Polak, 2021; Mohamedhoesein & Crul, 2018).

The research papers by Iglesias et al. (2021) and González et al. (2020) compare the academic results of students whose face-to-face learning activities were interrupted due to lockdown with the results of previous academic years. The results of these case studies show that students' academic performance in emergency remote learning conditions was significantly better than with face-to-face instruction, supporting the idea that the lockdown due to COVID-19 changed students learning strategies to a more consistent study habit, thus improving efficiency, while organisational factors could also contribute to the successful implementation of emergency distance teaching. Our results partially contradict these conclusions because despite the face-to-face universities making considerable efforts in terms of planning and organisation, they were insufficient to manage to implement successful distance learning.

6. Conclusions

The outbreak of the pandemic caused by COVID-19 had a serious impact on higher education, forcing most higher education institutions to make a paradigm shift and adapt their teaching and learning methodologies to the new emergency situation. In this regard, the face-to-face universities had to quickly transform their face-to-face educational methods to exclusively online education. Virtual learning thus became the new transitory educational environment for most university students.

Previous studies have analysed the effect of the pandemic on students' learning experiences and qualifications in face-to-face universities. However, online students have not been included in these studies. Although it is clear that the online universities had the necessary structure and there was no need for a change in teaching methodology, it is still possible that the learning results of these students were affected. This is why thorough research is needed on the effect of the pandemic on students at both face-to-face and online universities. Our study aims to fill this gap in the literature by analysing how the pandemic has affected the development of students' competences and learning process results in both face-to-face and online universities.

The findings of this study show that the pandemic has affected the development of competences, despite the students considering that they had achieved the learning objectives. However, this effect was varied depending on the student's university of origin. The online university students were affected more in terms of the development of competences, while the face-to-face university students were affected more in terms of the results of their learning process.

This work has provided interesting results on the effect of the pandemic on students' competences and learning results. Furthermore, the study makes a considerable contribution in terms of its conclusions, given that they reveal the difference between the two types of students and universities regarding the integration of online education in teaching and learning.

In this context, it is important to understand the perceptions of the students to be able to develop suitable interventions and to redress teaching and learning deficits. The analysis of students' perception of the effect of the pandemic helps us to understand the limits and potential of this type of distance learning, and can help us to anticipate and adapt the effects to possible future emergency transitions.

Several limitations of the present study must be highlighted. The first limitation refers to the restricted sample because students from only one university of each type took part. This research could be extended to include more universities of the two types, which would provide interesting insights. Second, the data were collected by means of a self-reported student questionnaire, this self reporting nature of the research possibly causing a bias, with some students under- or over-rating their perception of the selected elements.

To this effect, our results cannot be generalised and are only indicative of the tendency in these two universities. However, there are points of convergence between our results and those of other studies on students' perception of online learning, so we believe that our results on students' perceptions of the effect of the pandemic on competences and results of the online learning process contribute to the literature and help to better understand the effect of the pandemic on students' performance. A complementary understanding of this effect would be gained from gathering teachers opinions to provide a clearer picture of this process and to evidence the opinions of the two groups involved (teachers and students).

Future research should try to replicate our results with samples of different populations to understand how institutional and contextual factors influence students' perception of the effect of the pandemic. Researchers could use qualitative research methods to explore the intrinsic reasons for the results obtained.

Despite the limitations mentioned previously, the global results of our study are highly important because there are only a few previous studies on the impacts of the COVID-19 pandemic on different aspects of the experience of face-to-face university students and they have not considered the competences and learning process results, moreover they have obviated online university students.

This study provides knowledge that gives universities and academic researchers relevant information that will help them to manage future pedagogical challenges and approaches to online learning. In this regard, we call on those responsible for universities to bear student competences very much in mind when designing and implementing online educational programmes to increase the quality of the teaching and guarantee an optimal student experience.

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