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THE IMPACT OF ONLINE LEARNING ON BUSINESS AND ECONOMICS STUDENTS' MOTIVATION DURING THE COVID-19 PANDEMIC

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Abstract. This study aims to contribute to the knowledge about the impact of online education, induced by the Covid-19 pandemic, on the motivation of business and economics students. A survey was conducted with students from three higher education institutions located in Portugal, during the first semester of 2021, and 221 valid answers were obtained. The main contributions are as follows: online learning in the wake of the Covid-19 pandemic decreased students' motivation, which is contrary to studies on online learning conducted before the pandemic; an association was found between decreased motivation and sharing housing with pets and many people, for which there was no empirical evidence yet; two main determinants of the learning experience that influence students' motivation were identified, namely decreased learning and increased difficulty of the assessment process.

Keywords: students, motivation, Covid-19, pandemic, online learning.

JEL Classification: M49, M19.

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1. Introduction

The relevance of this study's topic is fundamentally justified by three factors. Firstly, the Covid-19 pandemic led several countries to impose the suspension of face-to-face classes in higher education establishments and the rapid transition to online learning and learning methodologies (Syauqi et al., 2020; Tan, 2021; Daniels et al., 2021; Alasmari, 2021). Secondly, some pre-Covid-19 studies on the impact of online learning on student motivation, suggest that e-learning can increase student motivation (Lewis et al., 2014; Harsasi, 2015; Kitching et al., 2015; Indira & Sakshi, 2017). And finally, the results of these previous studies are not relevant to characterize the existing situation during the Covid-19 pandemic, in which online learning is integrated into other confinement measures that prevent social interaction between students and teachers. These three factors justify carrying out further studies on the impact of online learning on student motivation amid the Covid-19 pandemic.

The general objective of this study is to contribute to the knowledge about the impact of the Covid-19 pandemic induced online learning, on the motivation to attend economic and business sciences courses. The specific objectives of this paper are to analyze: the impact of online learning on motivation to attend courses; the association between the characteristics of the accommodation used during online learning and student motivation; the consequences of online education on the learning experience and its association with student motivation; students' perception of the possible continuation of online learning in the post-Covid-19 pandemic.

The conditions of the accommodation used during online learning, and its relationship with student motivation and performance, are also a current concern for researchers (Kim & Zulueta, 2020; Adedoyin & Soykan, 2020; Serhan, 2020; Quach & Chen, 2020; 2021; Peimani & Kamalipour, 2021; Yan et al., 2021), since living conditions in this context have an extended effect in learning conditions (Fogarty, 2020). However, there is no empirical evidence regarding the influence of accommodation characteristics, such as the number of people and the company of pets on student motivation. This gap justifies the development of new empirical studies.

The consequences of online education on the learning experience during the Covid-19 pandemic is also a current concern for researchers (Daniels et al., 2021; Alasmari, 2021; Peimani & Kamalipour, 2021; Pham et al., 2021; Nguyen et al., 2021; Agasisti & Soncin, 2021). There seems to be however no homogeneity in the determinants of the learning experience and there is a gap in the empirical evidence of the association between these determinants and student motivation. This gap justifies a new study that empirically tests the association between the determinants of the learning experience and student motivation.

To address the objectives of this study, a survey was conducted among students of economic and business sciences from three higher education institutions located in Portugal and geographically dispersed, with the aim of collecting evidence about the country in general. The survey was applied at the end of the first semester of 2021, during which higher education establishments were forced to adopt online learning due to the worsening of the Covid-19 pandemic. A sample of 221 valid responses was obtained.

2. Literature review

Studies conducted before 2020 on the impact of online learning on student motivation suggest that e-learning can have beneficial in this perspective (Lewis et al., 2014; Harsasi, 2015; Kitching et al., 2015; Indira & Sakshi, 2017). The causes for this increase can be explained by the flexibility provided to students, in terms of learning speed (Indira & Sakshi, 2017) and the stimulus to search for additional information beyond that provided by face-to-face learning (Harsasi, 2015). Further, e-learning seems to be associated with improved learning and changes in practice to include more frequent feedback and assessment (Lewis et al., 2014) which can be conducive to improved intrinsic and extrinsic motivation in conjunction with other internal, external, and contextual factors, including time management, system flexibility and learners' expectations (Kitching et al., 2015).

Yet, the results of previous studies are not convergent with those presented in studies carried out during the Covid-19 pandemic (Syauqi et al., 2020; Tan, 2021; Çevik & Bakioğlu, 2022). This divergence of results suggests that the results of studies prior to 2020 might not be relevant to characterize the situation existing during the Covid-19 pandemic. The circumstances of the type of e-learning implemented during the pandemic where full online learning was imposed during lockdown with very little time for the academic community to prepare or adjust, resulting in what some authors refer to as remote emergency learning, since the crisis-response digital transformation methods adopted by universities, simply affected the delivery media without taking into consideration the effective online education theories and models (Adedoyin & Soykan, 2020). Simply put, the digital mode of teaching in higher education has moved from being mostly the personal choice of teachers to a sudden change in teaching methodology, due to a crisis (Fogarty, 2020).

Syauqi et al. (2020) analyzed the perceptions on online learning during the Covid-19 pandemic of 56 mechanical engineering students from an Indonesian educational establishment. The perceptions analyzed by Syauqi et al. (2020) focus on five themes: teaching management, effectiveness of knowledge transfer; quality of the teaching materials; ease of access to online resources; permanence of online education in the post-Covid 19 pandemic. The work of Syauqi et al. (2020) suggests that: most students consider that the management of education continued to be ensured online; the majority of students feel that knowledge and performance were diminished by online learning; students did not present a clear position regarding the quality of the teaching materials made available; access to teaching and learning resources was mostly perceived as having improved; most students feel that it will not be beneficial to maintain online learning in the future. Tan (2021) analyzed the impact of the Covid-19 pandemic on higher education students, through a survey to a convenience sample of students from a higher education institution in Malaysia. The results obtained by Tan (2021) show that: students were satisfied and motivated with their courses before the Covid-19 pandemic forced the replacement of face-to-face teaching with online learning; the physical presence of colleagues and teachers is a factor that boosts motivation; confinement generated difficulties in concentration, which, together with the lack of physical interaction with colleagues and teachers, led to a very significant decrease in students' motivation and performance, with many of them considering dropping out of the course. As causes for the decrease in student performance, Tan (2021) presented: lack of infrastructure to support teaching itself; lack of social support for the investigation; poor internet quality. Other authors reference the importance of access to good technological conditions for motivation and the impact of high student self-efficacy as a predictor of motivation in online learning settings (Çevik & Bakioğlu, 2022).

The characteristics of students' accommodation during online learning, and its relationship to student motivation and performance, are also a current concern for researchers (Kim & Zulueta, 2020; Adedoyin & Soykan, 2020; Serhan, 2020; Quach & Chen, 2020; 2021; Peimani & Kamalipour, 2021). Kim and Zulueta (2020) conducted a study with a sample of Japanese university students who were confined to their families' homes. Their results suggest the

increase in stress from the coexistence of the entire family in small spaces for long periods of time (Kim & Zulueta, 2020). In the specific case of the COVID-19 driven migration to full online methodologies of teaching, the academic community faced several challenges, such as technological factors (bad internet connections from teachers and students, outdated and insufficient technological devices), socio-economic factors (which affected the very ability to access a computer and internet for learning), human and pet's intrusions, digital competence of students and instructors (Adedoyin & Soykan, 2020; Sari et al., 2022; Yong et al., 2022). Although without empirical evidence, Adedoyin and Soykan (2020) suggest that pets may be responsible for decreased concentration during the teaching and learning process. A study of Virginia Commonwealth University's students concludes that accommodation conditions are critical to academic success and motivation during the Covid-19 pandemic (Quach & Chen, 2021). Internet instability, lack of study space and poor accommodation conditions are the variables that seem to have the greatest influence on poor attention, demotivation and school performance (Quach & Chen, 2021). Serhan (2020) and Peimani and Kamalipour (2021) also consider that student motivation during online learning is dependent on accommodation conditions such as access to high quality internet.

The consequences of online learning on the learning experience during the Covid-19 pandemic are another current concern for researchers (Daniels et al., 2021; Alasmari, 2021; Peimani & Kamalipour, 2021; Pham et al., 2021; Nguyen et al., 2021). Daniels et al. (2021) surveyed a convenience sample of 98 Canadian undergraduate students, with the aim of analyzing students' motivation, their perception of success, the online assessment process and academic dishonesty, before the Covid-19 pandemic and during the online learning period caused by the pandemic. Daniels et al. (2021) concluded the following: student motivation decreased during online learning; online assessment is associated with increased academic dishonesty, which is associated with decreased motivation. Alasmari (2021) concluded that Covid-19 pandemic related online learning, has altered the teaching, and learning experience of professors and students at the University of Jeddah. The rapid shift to this modality of education, caused by the demands of the pandemic, did not allow for the development of efficient support infrastructures (Alasmari, 2021). According to the Alasmary (2021), the development of efficient support infrastructure alone can overcome the disadvantages and challenges of distance learning, namely the decrease in interaction between teachers and students and the greater demand for technological skills (Alasmari, 2021; Vishnu et al., 2022). Emergency remote teaching during the Covid-19 pandemic was associated with social distancing and isolation, and it has been proposed that leaning abilities may be compromised due to the decrease in interaction between students and teachers (Peimani & Kamalipour, 2021) as well as amongst the students themselves, thus constraining the collaborative aspect of learning (Bamoallem & Altarteer, 2022). Peimani and Kamalipour (2021) consider that the decrease in interaction between students and teachers is one of the main problems of online learning, whose consequences are manifested in the decrease of learning abilities. Non-verbal communication is an essential part of the teaching and learning process in higher education, and this possibility is very much compromised with online learning, as most participants have their camera turned off (Peimani & Kamalipour, 2021). Some authors go so far as to consider that students' satisfaction with online learning depends on how the chosen pedagogical methods foster the interaction between students and teachers (Pham et al., 2021; Nguyen et al., 2021).

3. Methodology

The first specific objective of this study is the analysis of the impact of online education on the motivation to attend economics and business courses; this corresponds to the following research question:

Q1. Has online learning, resulting from the limitations imposed by the Covid-19 pandemic, changed student motivation?

The second specific objective of this study is to analyze the association between the characteristics of student accommodation, used during online learning, and student motivation (Figure 1). To respond to this objective, the following research question was elaborated:

Q2. Is there an association between the characteristics of the student accommodation, used during online learning, and changes in motivation?

Regarding the characteristics of student accommodation, the following variables were considered: number of additional inhabitants in addition to the student, pet companionship and internet performance. The selection of these variables is based on studies carried out from 2020 onwards, which suggest that student motivation is associated with accommodation characteristics. Internet performance is suggested by Kim and Zulueta (2020), Serhan (2020), Quach and Chen (2021), Peimani and Kamalipour (2021), Tan (2021), and Çevik and Bakioğlu (2022). Adedoyin and Soykan (2020) suggested that sharing housing with other people as well as pets may be a determinant of decreased concentration and learning. These conclusions highlight the relevance of analyzing the pet companionship and the number of additional inhabitants in addition to the student in the house, as determinants of the learning experience.

The third specific objective of this study is to analyze the consequences of online education on the learning experience and its association with student motivation (Figure 1). To respond to this objective, two research questions were developed:

Q3. Has online education, resulting from the limitations imposed by the Covid-19 pandemic, changed the learning experience of students?

Q4. Is there an association between the students' learning experience and changes in motivation?

To analyze the consequences of online education on the learning experience, students' perceptions of the determinants suggested by some authors were analyzed, including interaction with colleagues and teachers (Syauqui et al., 2020; Tan, 2021; Peimani & Kamalipour, 2021), student learning (Syauqui et al., 2020; Tan, 2021; Daniels et al., 2021), the assessment process (Daniels et al., 2021) and academic dishonesty (Daniels et al., 2021).

The fourth specific objective of this study is to analyze students' interest in maintaining online learning in the post-pandemic period (Figure 1), which led us to our fifth and final research question:

Q5. Is there an association between changes in motivation and the interest in maintaining online learning in the post-pandemic period?

Conducting online surveys has been have shown by previous studies to be a suitable data collection method to analyze students' perceptions (Vicente et al., 2017; Syauqi et al., 2020; Daniels et al., 2021; Tan, 2021). Following this methodology, and to answer the previously formulated research questions, a survey was carried out with a convenience sample of students from three geographically dispersed Portuguese higher education institutions, located in Porto, Lisbon and the Algarve, belonging to the same private economic group, but geographically dispersed. The universe under analysis is the students of courses in economic and business sciences, which totals 1414 students.

As suggested by several researchers (Vicente et al., 2016; Machado & Nunes, 2020), a pilot test of the initial survey was carried out using a convenience sample of university students. The final version of the survey incorporated the suggestions received during the pilot test and was placed on the Google forms platform, a method considered adequate in previous studies (Syauqi et al., 2020; Daniels et al., 2021; Tan, 2021). The survey was conducted at the end of the first semester of 2021, when restrictions imposed by the Portuguese government were still in force, preventing face-to-face classes.

Data collection was organized in three sequential phases. On the first phase, the online questionnaire link was sent by e-mail to the 1414 students of economic and business sciences that make up the universe of this study; the invitation to participate was reiterated a week later via email (phase 2). Two weeks after the initial contact with the students and, given the small number of existing responses, the survey link was shared through the WhatsApp groups of each of the classes in the universe, as suggested by Tan (2021). With these three phases of data collection, 221 completed questionnaires were collected, which translates a response rate of 16%. Although the response rate is low, the number of inquiries received is identical to the studies by Vicente et al. (2017), Ahmed et al. (2021), Tan (2021), and superior to those of Syauqi et al. (2020) and Selvarajah and Ali (2021). The following were identified as the main characteristics of the respondents: gender, age, attended course, course year. Regarding gender, 53% of the respondents are female (n = 118) and 47% are male (n = 103). As for the age of the respondents, the majority (62%) are under 25 years old (n = 138), 18% are between 25 and 30 years old (n = 40), and 20% are over 30 years old (n = 43). Most of the respondents (83%) are undergraduate students (n = 183), and 17% are master's students (n = 38). Concerning the academic year, 44.8% of the respondents are in their first year (n = 99), 35.3% in their second year (n = 78), and 19.9% are in their third year (n = 44).

The objectives of this study, and the research questions formulated, require the statistical treatment of nominal variables. The associations between these variables were performed using the Chi-Square independence test, as suggested by Nunes and Machado (2020) and Machado and Silva (2021). This test presents the null hypothesis that the variables are independent and, as the alternative hypothesis, that the variables are not independent (Siegel & Castellan, 1988). To measure the intensity of the association, Cramer's V coefficient was used, as suggested by Machado et al. (2021), where coefficient values lower than 0.30 are considered weak association, values between 0.30 and 0.39 are moderate association and strong association is attributed to values higher than 0.39. Goodman and Kruskal's Lambda was used to measure the meaning of strong associations, as it is a test that allows the definition of the meaning of the association between the nominal variables (independent and dependent) (Machado, 2019a, 2019b). This test considers the null hypothesis that the Lambda value is zero and, as the alternative hypothesis that the Lambda is different from zero (Siegel & Castellan, 1988). The value of this test is based on the proportional reduction of the prediction error, with the value 1 meaning that this knowledge allows a 100% reduction in the prediction error on the behavior of the dependent variable (Siegel & Castellan, 1988).

4. Results analysis and discussion

4.1. Online learning and student motivation

To answer the first research question, the variable impact of online learning on the motivation to attend the course was created, which presents the three response categories (Table 1). Its analysis allows us to conclude that online learning had a strong impact on the motivation to attend economic and business sciences courses, for the follow-

Table 1. Impact of online learning on student motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

Impact of online learning on student motivation	Frequency	Percentage
Decreased motivation	139	63%
Unchanged motivation	60	27%
Increased motivation	22	10%
TOTAL	221	100%

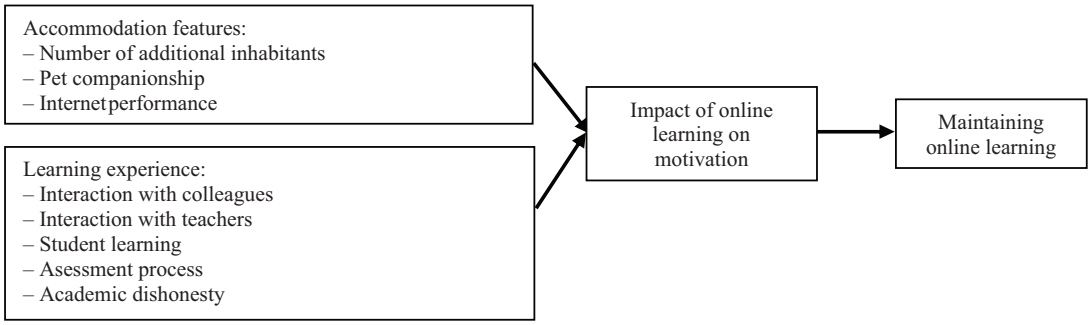

Figure 1. Research design (source: author's own conception)

ing reasons: most students consider that their motivation has decreased (63%); 27% of students believe that their motivation has not been changed by online learning; only 10% of students feel that their motivation has increased.

These results differ from those reported by the studies carried out before 2020 on online learning (Lewis et al., 2014; Harsasi, 2015; Kitching et al., 2015; Indira & Sakshi, 2017), which suggests that online learning at the time of the Covid-19 pandemic has specific characteristics that require further studies. As a cause for this divergence, the influence of other external factors, such as other confinement measures that prevent social interaction, on student motivation is suggested.

4.2. Accommodation characteristics and student motivation

To answer the second research question, to analyzing the association between accommodation characteristics and changes in motivation, three characteristics of student accommodation during online learning were explored: location, number of additional inhabitants in the accommodation, pet companionship, internet performance.

The first characteristic of the accommodation studied was the number of additional inhabitants in the accommodation. Results allow us to conclude that the highest frequency of responses was in sharing the accommodation with two more people (32%), 25% shared the accommodation only with another person, 24% with three more people and 19% with four or more people. The association between the impact on student motivation and the number of additional inhabitants in the accommodation is presented in Table 2 and its analysis allows the following conclusion: the decrease in motivation is more frequent in students who shared the accommodation with three or more people (n = 66), than in students who shared accommodation with only one other person (n = 29).

To analyze the association between these two variables, the chi-square test of independence was used, with $X^2_{(4,\ N\ =\ 221)}$ = 18.113, p = 0.001. These results allow us to conclude that there is an association between the number of additional inhabitants in the accommodation and the impact on student motivation, for an error of 1%. Cramer's V coefficient was used to measure the intensity of this

Table 2. Association between the number of inhabitants and the impact on motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

Impact of online learning on student motivation	Number of additional inhabitants			TOTAL
	1 person	2 people	≥ 3 people	
Decreased motivation	29	44	66	139
Unchanged motivation	23	13	24	60
Increased motivation	3	14	5	22
TOTAL	55	71	95	221

association, obtaining a value of 0.202, which suggests a moderate association. Figure 2 graphically analyzes this association and allows us to conclude that online learning proportionally decreased the motivation of students who shared the accommodation with more occupants, namely: the motivation of 69% of students who shared accommodation with 3 or more people decreased, from 62% of students who shared accommodation with two other people, 53% of students who shared accommodation with only one other person.

The second characteristic of the accommodation addressed was the pet companionship, and it was concluded that most students (51%) did not share their accommodation with pets. The association between the impact on motivation and pet companionship is presented in Table 3 and its analysis allows the following conclusion: the decrease in motivation is more frequent in students who were accompanied by pets (n = 78) than in the other students (n = 61); the increase in motivation is more frequent in students who were not accompanied by pets (n = 13) than in other students (n = 9).

To analyze the association between these two variables, the chi-square test of independence was used, with $X^2_{(2,\ N=\ 221)}$ = 7,034, p = 0.030. These results allow us to conclude that there is an association between the pet companionship and the impact on student motivation, for an error of 4%. Cramer's V coefficient was used to measure the intensity of this association, with a value of 0.178, which suggests that the association is weak. Figure 3 graphically analyzes this association and leads to the following conclusion: the decrease in student motivation is

Table 3. Association between pet companionship and the impact on student motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

Impact of online learning on student motivation	Pet companionship		TOTAL
	Yes	No	
Decreased motivation	78	61	139
Unchanged motivation	22	38	60
Increased motivation	9	13	22
TOTAL	109	112	221

proportionally higher in students who were accompanied by pets (72%) than in other students (54%); the increase in student motivation is proportionately higher for students without pets (12%) than for other students (8%).

The last accommodation characteristic studied was the performance of the internet used during online education which measured using a Likert scale, as performed by Tan (2021). The results obtained allow us to conclude that most students (65%) classify the internet performance as being good (n = 100) or very good (n = 43); 59 students rate it as reasonable (27%); the remaining 8% classify it as bad (n = 17) or very bad (n = 2). The association between the impact on motivation and internet performance is presented in Table 4 and its analysis allows the following conclusion: there was no increase in motivation of any of the students whose internet performance was classified as bad or very bad.

Table 4. Association between internet performance and student motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

Impact of online learning on student motivation	Internet performance					TOTAL
	Very Bad	Bad	Fair	Good	Very Good	
Decreased motivation	2	16	43	56	22	139
Unchanged motivation	0	1	12	35	12	60
Increased motivation	0	0	4	9	9	22
TOTAL	2	17	59	100	43	221

To analyze the association between these two variables, the chi-square test of independence was used, with $X^2_{(8,\ N=\ 221)} = 20.151$, $p = 0.016$. These results allow us to conclude that there is an association between the pet companionship and the impact of online learning on student motivation, for an error of 2%. Cramer's V coefficient was used to measure the intensity of this association, obtaining a value of 0.214, which suggests a moderate association. Figure 4 graphically analyzes this association and allows us to conclude that the decrease in motivation is proportionally higher in students with poor internet performance (94%) or very poor (100%), compared to students with good (56 %) or very good internet performance (51%).

The results obtained allow us to conclude that there is an association between the characteristics of the student accommodation during online learning, and student motivation, as suggested by other studies carried out during the pandemic. Decreased motivation is proportionately more frequent in students who reported poor internet performance, as suggested by Kim and Zulueta (2020), Serhan (2020), Quach and Chen (2021), Peimani and Kamalipour (2021), Tan (2021) and Çevik and Bakioğlu (2022). The decrease in motivation is proportionately more frequent in students who shared their accommodation with pets and with many people. These conclusions are in line with those suggested by Adedoyin and Soykan (2020), although there is still no empirical evidence of the importance of these two factors.

4.3. Impact of online learning on the learning experience

To address the third research question, analyzing the impact of online education on the learning experience, five determinants suggested by the reviewed literature were studied: decreased interaction with colleagues, decreased interaction with teachers, decreased learning, increased difficulty in the assessment process and increased academic dishonesty. Each of these determinants were analyzed using a 5-point Likert scale, as suggested by Daniels et al. (2021).

Regarding the first determinant of the learning experience, results allow us to conclude that most students (70%) agree (n = 55), or strongly agree (n = 100), that online learning caused a decrease in interaction with colleagues; only 14% of students disagree (n = 23), or strongly disagree (n = 8) with the idea that online learning has reduced interaction with peers; 16% of students have no opinion on this topic (n = 35).

Vis-a-vis the second determinant of the learning experience, results allow us to conclude that most students (70%) agree (n = 57), or strongly agree (n = 98), that online learning caused a decrease in interaction with teachers;

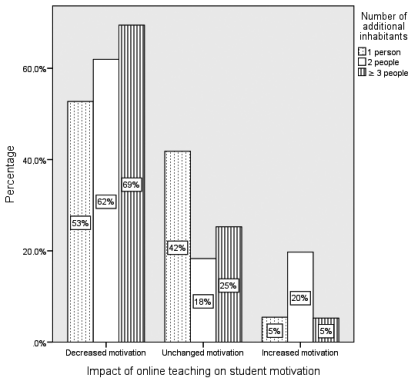

Figure 2. Association between the number of inhabitants and the impact on motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

only 15% of students disagree (n = 27), or strongly disagree (n = 7) with the idea that online learning has reduced interaction with teachers; 15% of students have no opinion on this topic (n = 32).

Concerning the third determinant of the learning experience, results allow us to conclude that most students (55%) agree (n = 50), or strongly agree (n = 71), that online learning caused a decrease in learning; only 22% of students disagree (n = 32), or strongly disagree (n = 17) with the idea that online learning has reduced learning; 23% of students have no opinion on this topic (n = 51).

On the subject of the fourth determinant of the learning experience, results allow us to conclude that most students (57%) agree (n = 50), or strongly agree (n = 77), that online learning made the process difficult of evaluation; only 24% of students disagree (n = 33), or strongly disagree (n = 21) with the idea that online learning made the assessment process difficult; 18% of students have no opinion on this topic (n = 40).

Regarding the fifth determinant of the learning experience, results allow us to conclude that students have a very diverse position on the increase in academic dishonesty during online learning, for the following reasons: about a third of students (33%) disagrees (n = 38) or strongly disagrees (n = 35) with the increase in academic dishonesty; about 37% of students agree (n = 30) or strongly agree (n = 51) with this determinant of the learning experience; a high number of students (30%) have no opinion on this topic (n = 67).

The results in relation to the third research question, allow us to conclude that most students consider that online education has changed their learning experience, insofar as it has reduced interaction with colleagues and teachers, has reduced learning and has made learning as well as the assessment process more difficult. These results are in line with those reported by Syauqui et al. (2020), Tan (2021) and Daniels et al. (2021). However, the results now obtained are not conclusive regarding the increase in academic dishonesty. Contrary to what was reported by Daniels et al. (2021), students did not present a clear position on this determinant of the learning experience.

4.4. Learning experience and student motivation

To answer the fourth research question, analyzing the association between the learning experience and motivation, the associations between each of the five determinants described above and their impact on motivation were explored. The association between decreased interaction with peers and motivation is shown in Table 5. Its analysis leads to the following conclusion: the decrease in motivation is much higher in students who consider that online learning has reduced interaction with peers (n = 115), than in students who have a contrary opinion (n = 9).

Table 5. Association between decreased interaction with colleagues and student motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

Impact of online learning on student motivation	Decreased interaction with colleagues			TOTAL
	Disagreement	Indifference	Agreement	
Decreased motivation	9	15	115	139
Unchanged motivation	15	14	31	60
Increased motivation	7	6	9	22
TOTAL	31	35	155	221

To analyze the association between these two variables, the chi-square test of independence was used, $X^2_{(4,\ N=\ 221)} = 30.690$, $p < 0.001$. These results allow us to conclude that there is an association between the decrease in interaction with colleagues during the online learning, and the change in student motivation, for an error of 1%. Cramer's V coefficient was used to measure the intensity of this association, yielding a value of 0.264, which suggests a moderate association. Figure 5 graphically analyzes this association and allows us to conclude that most students, who report a decrease in interaction with colleagues, present a decrease in their motivation (74%), whereas the decrease in motivation only occurred

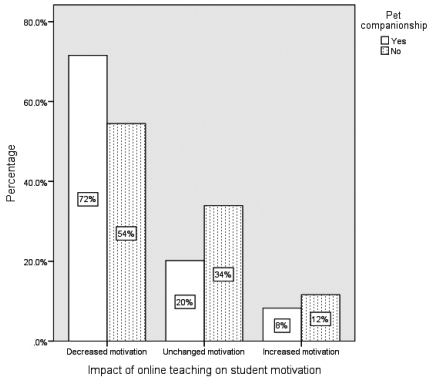

Figure 3. Association between pet companionship and student motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

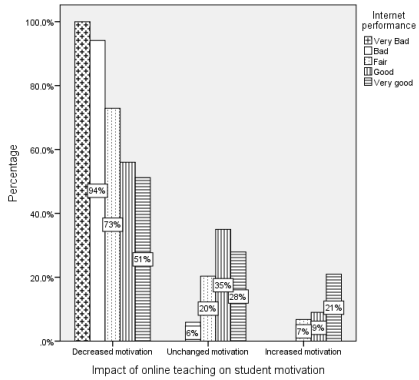

Figure 4. Association between internet performance and student motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

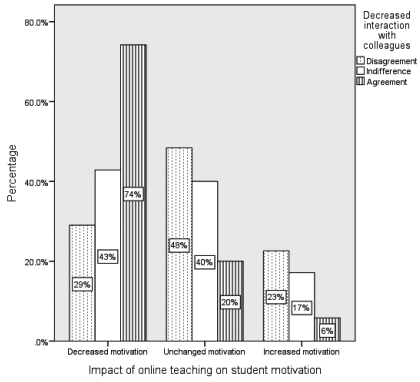

Figure 5. Association between decreased interaction with colleagues and student motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

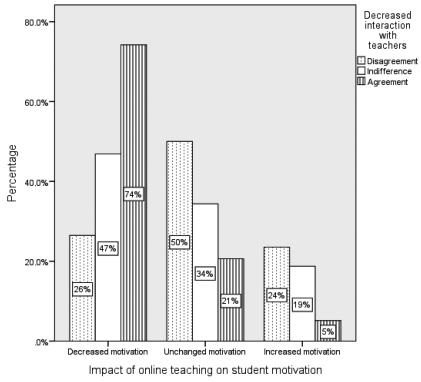

Figure 6. Association between decreased interaction with teachers and student motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

in 29% of students who did not feel the decrease in interaction with colleagues.

The association between the decrease in interaction with teachers and motivation is shown in Table 6. Its analysis leads to the following conclusion: the decrease in motivation is considerably more frequent in students who consider that online learning has decreased interaction with teachers (n = 115), than in students who have a contrary opinion (n = 9).

Table 6. Association between decreased interaction with teachers and student motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

Impact of online learning on student motivation	Decreased interaction with teachers			TOTAL
	Disagree-ment	Indiffe-rence	Agree-ment	
Decreased motivation	9	15	115	139
Unchanged motivation	17	11	32	60
Increased motivation	8	6	8	22
TOTAL	34	32	155	221

To analyze the association between these two variables, the chi-square test of independence was used, with $X^2_{(4,\ N=\ 221)} = 33.551$, $p < 0.001$. These results allow us to conclude that there is an association between the decrease in interaction with teachers and the change in student motivation, for an error of 1%. Cramer's V coefficient was used to measure the intensity of this association, yielding a value of 0.276, which suggests a moderate association. Figure 6 graphically analyzes this association and allows us to conclude that most students, who identify a decrease in interaction with teachers, also present a decrease in their motivation (74%); while the decrease in motivation only occurs in 26% of students who did not feel the decrease in interaction with teachers.

The association between decreased learning and student motivation is shown in Table 7. Its analysis allows us to conclude that the decrease in motivation is much higher in students who consider that online learning has reduced learning (n = 110), than in students who have a contrary opinion (n = 8).

Table 7. Association between decreased learning and student motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

Impact of online learning on student motivation	Decreased learning			TOTAL
	Disagree-ment	Indiffe-rence	Agree-ment	
Decreased motivation	8	21	110	139
Unchanged motivation	25	24	11	60
Increased motivation	16	6	0	22
TOTAL	49	51	121	221

To analyze the association between these two variables, the chi-square test of independence was used, yielding $X^2_{(4,\ N=\ 221)} = 105.656$, $p < 0.001$. These results allow us to conclude that there is an association between the decrease in learning, which occurred during online learning, and the change in student motivation, for an error of 1%. Cramer's V coefficient was used to measure the intensity of this association, obtaining a value of 0.489, which suggests a strong association. In view of the intensity of this association, the Lambda of Goodman and Kruskal was used, which presented the value of 0.244, when considering the variable impact of online learning on motivation, as a dependent. The test results are statistically significant, for an error of 3%, given that $p = 0.022$, and confirm the meaning of the association, that is, it is the variable decrease in learning that influences motivation. Figure 7 graphically analyzes this association and allows us to conclude that most students who consider that there has been a decrease in learning, have a decrease in their motivation (91%); while the decrease in motivation only occurred in 16% of the students who did not feel the decrease in learning.

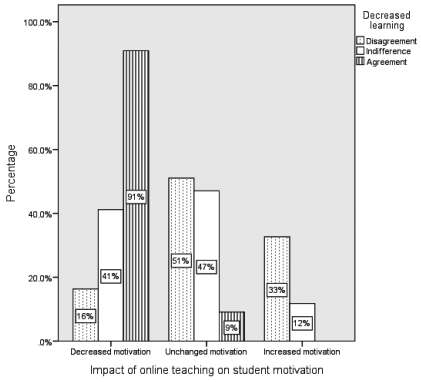

Figure 7. Association between decreased learning and motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

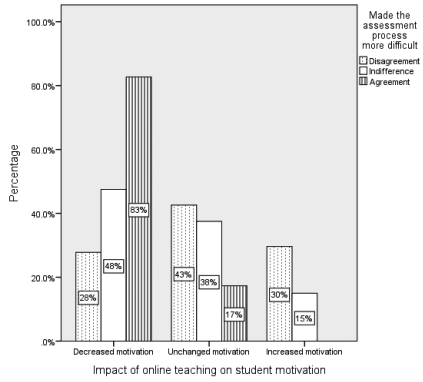

Figure 8. Association between the difficulty of the assessment process and student motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

The association between the difficulty of the assessment process and student motivation is shown in Table 8. Its analysis leads to the conclusion that the decrease in motivation is much higher in students who consider that online learning has reduced learning (n = 105), than in students who have a contrary opinion (n = 15).

Table 8. Association between the difficulty of the assessment process and student motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

Impact of online learning on student motivation	Made the assessment process more difficult			TOTAL
	Disagreement	Indifference	Agreement	
Decreased motivation	15	19	105	139
Unchanged motivation	23	15	22	60
Increased motivation	16	6	0	22
TOTAL	54	40	127	221

To analyze the association between these two variables, the chi-square test of independence was used, with $X^2_{(4,\ N=\ 221)} = 65.500$, $p < 0.001$. These results allow us to conclude that there is an association between the decrease in learning, which occurred during online learning, and the change in student motivation, for an error of 1%. To measure the intensity of this association, Cramer's V coefficient was used, obtaining a value of 0.385, which suggests a strong association. Figure 8 graphically analyzes this association and allows us to conclude that most students, who consider the assessment process to have been difficult, show a decrease in their motivation (83%); while the decrease in motivation only occurred in 28% of students who did not feel that online learning made the assessment process difficult.

The association between the increase in academic dishonesty and motivation is shown in Table 9. Its analysis leads to the conclusion that the decrease in motivation is higher in students who consider that online learning has increased academic dishonesty (n = 70), than in students who have a contrary opinion (n = 33).

Table 9. Association between increased academic dishonesty and student motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

Impact of online learning on student motivation	Academic dishonesty has increased			TOTAL
	Disagreement	Indifference	Agreement	
Decreased motivation	33	36	70	139
Unchanged motivation	31	21	8	60
Increased motivation	9	10	3	22
TOTAL	73	67	81	221

To analyze the association between these two variables, the chi-square test of independence was used, with $X^2_{(4,\ N=\ 221)} = 32.552$, $p < 0.001$. These results allow us to conclude that there is an association between the decrease in learning and the change in student motivation, for an error of 1%. Cramer's V coefficient was used to measure the intensity of this association, obtaining a value of 0.271, which suggests a moderate association. Figure 9 graphically analyzes this association and allows us to conclude that most students, who consider that academic dishonesty has increased, have a decrease in their motivation (86%); while the decrease in motivation only occurred in 45% of students who did not identify an increase in academic dishonesty.

The results obtained regarding the fourth research question, allow us to conclude that all determinants of the learning experience are associated with the changes found in student motivation during the Covid-19 pandemic induced online learning. These results make it possible to rank the importance of this association. The determinant with the greatest impact on the decrease in motivation is the perceived decrease in learning (Cramer's V = 0.489),

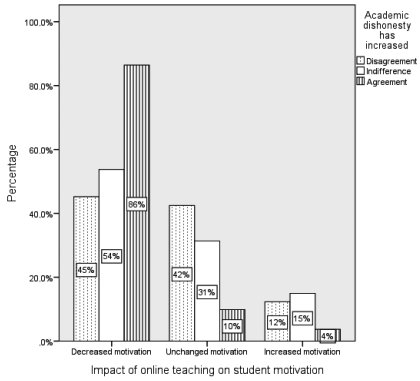

Figure 9. Association between increased academic dishonesty and student motivation (source: author's own calculation, based on IBM SPSS Statistics for Windows)

having even been able to statistically prove the meaning of this association through Goodman and Kruskal's Lambda (Lambda = 0.244, where change in student motivation is the dependent variable). The second determinant with a strong impact on the decrease in student motivation is the increased difficulty of the assessment process during online learning (Cramer's V = 0.385). With a weaker impact on student motivation, the following determinants of the learning experience were identified: the decrease in interaction with colleagues (Cramer's V = 0.264) and teachers (Cramer's V = 0.276) and the increase in academic dishonesty (Cramer's V = 0.271). These conclusions differ from those reported by Daniels et al. (2021) who identified the increase in academic dishonesty as the main determinant influencing motivation.

4.5. Interest in maintaining online learning

To address the fifth research question, analyzing the association between changes in student motivation and interest in maintaining online learning in the post-pandemic period, the variable continuation of online education was created, analyzed using a 5-point Likert scale, as suggested by Daniels et al. (2021). The results obtained allow us to conclude that most students (51%) disagree (n = 34), or strongly disagree (n = 78), with the continuation of online learning in the post-Covid-19 pandemic; about 33% of students agree (n = 34) or strongly agree (n = 39) with this determinant of the learning experience; 16% of students have no opinion on this topic (n = 36).

The association between changes in motivation and interest in maintaining online learning in the post-pandemic period is presented in Table 10. This analysis allows us to conclude that the disagreement about continuing online education in the post-pandemic is higher among students whose motivation decreased (n = 97), than in students whose motivation was not affected (n = 14) or increased (n = 1).

To analyze the association between these two variables, the chi-square test of independence was used, yielding $X^2_{(4,\ N=\ 221)} = 90.93$, $p < 0.001$. These results allow us to

Table 10. Association between motivation and interest in continuing online education (source: author's own calculation, based on IBM SPSS Statistics for Windows)

Maintaining online learning in the post-pandemic	Impact of online learning on student motivation			TOTAL
	Decreased motivation	Unchanged motivation	Increased motivation	
Disagreement	97	14	1	112
Indifference	27	8	1	36
Agreement	15	38	20	73
TOTAL	139	60	22	221

conclude that there is an association between decreased motivation and the reported interest in maintaing online learning in the post-pandemic period, for an error of 1%. Cramer's V coefficient was used to measure the intensity of this association, obtaining a value of 0.454, which suggests a strong association. Given the intensity of this association, Goodman and Kruskal's Lambda was used, which presented a value of 0.394, when considering the interest in continuing online learning in the post-pandemic period, as a dependent. The test results are statistically significant, for an error of 1%, given that $p < 0.001$, and confirm the meaning of the association, that it is the impact of online learning on motivation that influences the variable maintaining online learning in the post-pandemic period. Figure 10 graphically analyzes this association and allows us to conclude that most students, whose motivation decreased during online learning, disagrees with the continuation of this type of learning in the post-Covid-19 pandemic (70%); while most students, whose motivation increased during online learning, agree with the continuation of this type of learning in the post-Covid-19 pandemic (91%).

These results are in line with those presented in other studies carried out during the pandemic (Syauqi et al., 2020) which conclude that most students consider that it will not be beneficial to maintain online learning. However, this study presents the additional contribution of the statistical validation of the association between decreased motivation

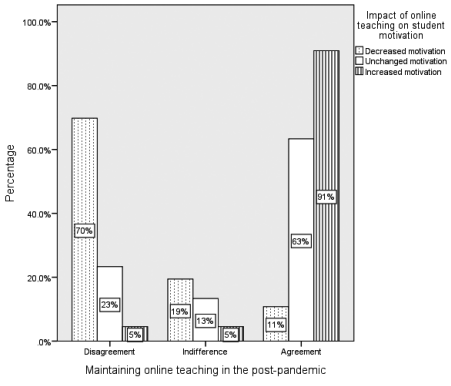

Figure 10. Association between student motivation and interest in maintaining online learning (source: author's own calculation, based on IBM SPSS Statistics for Windows)

during online learning and the perception that this type of learning should not continue in the post-pandemic period.

5. Conclusions

This study has four specific objectives, namely: to analyze the impact of online learning on the motivation to attend courses in the areas of economics and business; to analyze the association between the characteristics of the accommodation, used during online education, and student motivation; analyze the consequences of online education on the learning experience and its association with student motivation; to analyze students' perception of the possibility of maintaining online learning in the post-Covid-19 pandemic period.

Regarding the first objective, the present results indicate that the motivation of most students has decreased with online learning resulting from the Covid-19 pandemic. This conclusion contradicts other studies carried out before the pandemic, which suggest an increase in motivation resulting from the use of this type of learning.

Concerning the second objective, this study's results allow us to conclude that there is an association between the characteristics of the student accommodation during online education, and student motivation, in the following sense: the decrease in motivation is proportionally more frequent in students who shared the accommodation with pets and who reported poor internet performance; motivation decreased proportionally more as the number of inhabitants with whom the student shared the house increased.

Regarding the third objective, the results allow us to identify four determinants of the learning experience that were influenced by online learning due to the Covid-19 pandemic. Most students consider that online learning has reduced interaction with colleagues and teachers, has reduced learning and has increased the difficulty of the assessment process. Students did not have a clear position on the effect of online learning on the increase in academic dishonesty. Regarding the association of these determinants of the learning experience with student motivation, this paper's results indicate that the determinant with the greatest impact on the decrease in student motivation is the perceived decrease in learning, followed by the increase in the difficulty of the assessment process; the determinant that seems to impact student motivation the least is the decrease in interaction with colleagues.

Regarding the last objective of this study, this paper's results allow us to conclude that there is an association between motivation and interest in continuing online education in the post-pandemic period, in the sense that most students whose motivation increased agree with the continuation of this type of learning, while the majority of students whose motivation has decreased do not agree with maintaining of this type of learning in the post-pandemic.

The conclusions obtained allow the identification of four contributions, in the form of three theoretical implications and a managerial one. As a first theoretical implication is identified the conclusion that the effect of online learning on students' motivation is contradictory to previous studies, conducted before the pandemic. This divergence of results suggests that the previous studies might not be relevant to characterize the situation during the Covid-19 pandemic, in which online learning coexisted with other confinement measures that prevented social interaction. As second and third theoretical implications, two new factors associated with decreased student motivation during online learning are identified in this study: the company of pets; the increased number of cohabitants. These findings allow to extend the already existing knowledge about the factors affecting students' motivation. As a management implication, this study identifies the two main determinants of learning experience that affect students' motivation: the decrease in learning and the increase in the difficulty of the assessment process. The importance attributed to the effect of both determinants suggests the need for higher education institutions to invest in training the teaching staff in online pedagogical methodologies and techniques and in information and communication technologies that allow improving the learning experience and reducing the difficulty of the assessment process, during online education.

The main limitations of this study concern the fact that a convenience sample was used, which does not allow for the generalization of results; and the fact that the data collection method used did not allow the clarification of doubts about the survey questions. An attempt was made to minimize this last limitation by providing an email through which all doubts about the survey could be clarified.

The results of this study suggest the need for further research to understand why student motivation with online learning diverges before and during the Covid-19 pandemic. Further studies should also be carried out to analyze whether the pandemic has affected students' motivation to pursue professions in the economic and business sciences areas.

Author contributions

All authors contributed equally to the final product.

Disclosure statement

The authors declare that they do not have any financial, professional, or personal interests competing with other parties.

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