EDUCACIÓN

Undergraduate student performance in an accounting sciences program: An analysis on the use of emergency remote teaching

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This study aims to analyze the variation in academic performance of undergraduate students enrolled in the Accounting Sciences course of a public, federal university of Southern Brazil between the second academic semester of 2019 and the first semester of 2020. The research was documentary and descriptive, following a quantitative approach. The sample was composed of data from 281 students. Quantitative data analysis was carried out through the Statistical Package for the Social Sciences (SPSS) software. Results indicate that the implementation of emergency remote teaching due to social isolation caused by the COVID-19 pandemic did not impact student performance. However, analyzing the students' enrollment semester shows variation in the academic performance in 2017, which may be explored further by future research. Thus, this research contributes to understanding the new teaching model, supplying managers, students, teachers, and institutions new data regarding this issue.

Keywords: student performance, higher education, social isolation, COVID-19 pandemic

Desempeño de estudiantes de pregrado en Contabilidad: Un análisis del uso de la enseñanza remota de emergencia

El objetivo de esta investigación fue analizar la variación en el desempeño académico de los estudiantes matriculados en la carrera de grado en Ciencias Contables en una universidad pública federal del sur de Brasil, entre los semestres académicos de 2019/2 y 2020/1. Para ello, se

realizó una investigación documental, descriptiva en cuanto a objetivos y cuantitativa en cuanto al abordaje del problema. La muestra de investigación incluyó datos de 281 estudiantes utilizando la técnica de análisis de datos cuantitativos a través del software estadístico Statistical Package for the Social Sciencies (SPSS). Los resultados muestran que la adopción de educación remota de emergencia, debido al aislamiento social, no se reflejó en los coeficientes de ingresos. Sin embargo, al analizar el semestre de matrícula de estudiantes, la estadística apunta a una variación en los coeficientes de entrada de estudiantes en 2017, lo que puede ser mejor analizado por investigaciones futuras. Así, el resultado de esta investigación contribuye a la comprensión del nuevo modelo de enseñanza, aportando a los directivos, estudiantes, docentes y a la institución nuevos datos sobre el tema de este estudio.

Palabras clave: rendimiento del estudiante, enseñanza superior, aislamiento social, pandemia de COVID-19

Desempenho discente do graduando em Ciências Contábeis: Uma análise no uso do ensino remoto emergencial

O objetivo desta pesquisa foi analisar a variação de desempenho acadêmico de discentes matriculados na graduação de ciências contábeis, de uma universidade federal pública do sul do Brasil, entre os semestres acadêmicos de 2019/2 e 2020/1. Para isto realizou-se uma pesquisa documental, descritiva quanto aos objetivos e quantitativa quanto à abordagem do problema. A amostra da pesquisa contou com os dados de 281 discentes com a técnica de análise dos dados quantitativa empregada, por meio do *software* estatístico *Statistical Package for the Social Sciencies* (SPSS). Os resultados apontam que a adoção do ensino remoto emergencial, devido ao isolamento social, não refletiu nos coeficientes de rendimentos. Porém, ao analisar o semestre de ingresso dos discentes a estatística aponta variação nos coeficientes dos discentes ingressantes no ano de 2017, o que poderá ser melhor analisado por pesquisas futuras. Assim o resultado desta pesquisa contribui com o entendimento do novo modelo de ensino fornecendo a gestores, discentes, docentes e instituição novos dados a respeito do tema deste estudo.

Palavras-chave: desempenho discente, ensino superior, isolamento social, pandemia COVID-19

1. Introduction

Society is undergoing significant changes since the start of the coronavirus pandemic. According to the Brazilian Ministry of Health (2020), COVID-19 is a contagious disease caused by the SARS-COV-2 coronavirus. The illness is highly infectious and, on account of being novel for humans, there is no previously acquired immunity, making it even more contagious. The viral transmission occurs from an infected individual to a healthy subject, either through close personal contact, sharing contaminated objects and surfaces, or through saliva, sneezing, and cough, followed by contact with the mouth, nose, or eyes (Schuchmann et al., 2020).

Upon COVID-19's first identification in Brazil in March 2020, the Ministry of Health recommended containment measures, including social isolation. Research points that isolation is an effective way to reduce COVID-19's contamination rate (Moreira, Oliveira, & Gonçalves, 2020). Social isolation impacts several areas in society due to adaptations that must be carried out, such as closing schools and canceling public events, up to the complete blocking of a city's activities (Schuchmann et al., 2020).

Due to the pandemic, headlines showcased news concerning adaptations for the emergency period. *Veja Magazine*, an influential Brazilian weekly news magazine, published a piece regarding the construction and operation of field hospitals to meet the demand for COVID-19 hospitalizations (Ruprecht, 2020). 46% of companies during the pandemic adopted home office and work-from-home (WFH) arrangements (Mello, 2020). This was one of the strategies used for companies to maintain productivity while practicing social isolation.

In education, universities, academic departments, and undergraduate courses were required to adapt to reduce pedagogical damage and public health risks, ensuring the maintenance of quality and safe education. It is the responsibility of the deliberative instances of higher education institutions (HEI) to agree on fundamental decisions that subsidize professors' decisions as to how to conduct their disciplines. Institutional development plans, pedagogical planning, and departmental management projects required adaptation to encompass the rising emergency situation (Gusso et al., 2020).

The educational area suffered significant changes, and educational institutions agreed on a set of rules to be followed. At the Federal University of Rio Grande (FURG), Southern Brazil, the Teaching, Research, Extension, and Administration Council (COEPEA) published Resolution 023/2020, which provides general academic guidelines for undergraduate education during the emergency period. According to the guidelines, academic units must carry out their activities primarily online and not face-to-face.

In addition, according to COEPEA guidelines (2020), teachers should present a new curriculum for the emergency period whose content would guarantee the quality of student training, as well as their availability and strong suits, taking into account their altered routines. The new curriculum should also cover the need to adapt to the emerging pedagogical formats.

The coronavirus pandemic reveals the importance of understanding several circumstances. Santos et al. (2021) highlight the importance of the challenges of remote teaching: the manner in which teachers adapt the contents, classroom dynamics, expository classes, evaluations, among other variables. The strategies used to keep students interested and engaged with the classes and the course itself also change.

Previous studies have also addressed students' academic performance, for instance: Andrade and Corrar (2007) evaluated academic, demographic, and economic factors influencing students' performance. The impact of learning style on academic performance was verified by Silva and Oliveira Neto (2010). Costa (2020) analyzed the relationship between emotional intelligence, adherence the achievement goal theory, and academic performance. However, no research was identified investigating the relationship between the change to online education and students' performance, measured through their performance. Thus, we consider it a prominent research gap.

This study is based on the teaching method most widely used during the pandemic. It aims to answer the following question: What is the influence of the implementation of emergency remote teaching due to the pandemic in the performance of students enrolled in the undergraduate course of Accounting Sciences? Thus, this study aims to analyze the variation in academic performance after adopting emergency remote teaching for undergraduate students enrolled in the Accounting Sciences course of a public federal university of Southern Brazil between the second academic semester of 2019 and the first semester of 2020.

Given that academic performance is influenced by several factors, understanding these variables can encourage HEI to better prepare their students (Costa, 2020). The justification for this study is based on the discussion by Gusso et al. (2020), which highlights that some aspects are fundamental points for decision-making regarding teaching and learning. These aspects are linked to the repertoire of both teachers and students regarding management of the learning platform, the student's available time to participate in classes, and the teachers' conditions to evaluate student learning. As such, one can consider that analyzing performance during the emergency pandemic period is fundamental to subsidizing new decisions.

Empirically, this study's results may contribute to teachers and university management understanding the consequences of adopting emergency remote teaching. In the academic community, the contribution is related to the offer of conditions for student evaluation, development, and management. Theoretically, the study contributes to researchers investigating this issue; it fosters new research on the topic and contributes to the literature a relationship of variables related to student performance.

This study also concerns Rocha Neto and Leal (2017) and Gusso et al. (2020), whose performance-analyzing works contribute to the understanding of new learning processes, considering and discussing variables that are determinants of academic performance. Thus, it provides managers, students, teachers, and institutions with new data regarding this issue.

This paper is structured in five sections. In the first section, we contextualize the study in the literature, outlining the problem, research gap, justification, and intended objective. Section Two refers to the theoretical framework and literature review. It presents an overview of student academic performance and emergency remote teaching. Section Three describes the research's classification criteria, population, sample, instruments, data collection procedures, and data analysis techniques. Section Four presents the results found and discusses them regarding the literature. Section Five presents the study' conclusion and suggestions for future research. Finally, the consulted references are listed.

2. Literature review

2.1. Student academic performance

Student academic performance is related to several internal and external factors, such as family issues, society, and school experiences (Rivkin et al., 2005). Santos (2012) highlights that student performance is affected by the interaction between the students' own characteristics, such as personal and socioeconomic aspects, and the resources of courses and educational institutions.

Costa et al. (2017) note that learning is related to a particular interest and the need to reach a certain goal, thus emerging the concept of motivation. According to Lima et al. (2010), motivation is a fundamental part of the learning process. Motivated students learn significantly easier and achieve better academic performance.

Authors such as Martins (1999), Valle (2000), and Kasai (2000) highlight that academic performance should serve so that teachers could install a new sense of learning onto

their students. Thus, this performance could serve as a basis for the implementation of new study guidelines.

According to Costa and Boruchovitch (2004), the adequate use of learning strategies (cognitive: testing, elaboration, and organization; metacognitive: planning, monitoring, and regulation) is positively related to academic performance. Several types of scores can represent performance, including numbers on a scale of 0 to 10, or letters such as A, B, C, D, and E. Alternatively, classifications in Excellent, Great, Good, Regular, and Bad, among others, can be used (Buriasco, 2000).

Oliveira et al. (2009) argue that not only academic performance "could serve as a criterion for better study planning, but also the learning strategies used when studying could be categorized to be able to guide the student about their usage and diversification when studying [authors' translation]" (p. 532). From the methodological structure proposed by Silva and Oliveira Neto (2010), we analyzed 194 students, 29 teachers, and 40 undergraduate Accounting disciplines in a state public university in upstate São Paulo. The authors found that the combination of student learning styles, teachers, and disciplines impacts students' academic performance.

On the other hand, the study by Nogueira et al. (2013) reveals no significant interference of any of the learning styles on academic performance. For this study, the absence rate variable was the only one that presented a statistically significant behavior, thus displaying a direct relationship with academic performance.

Andrade and Corrar (2007) aimed at evaluating and relating academic, economic, and demographic factors that influence student's academic performance to properly direct teachers, pedagogical coordinators, and directors' efforts in teaching. They analyzed the notes obtained in the 2002 Exame Nacional de Cursos (ENC) – an annual evaluation carried out by the Brazillian Ministry of Education to measure the quality of higher education in Brazil. Upon analyzing 22.662 Accounting undergraduate students, the authors found evidence that all the variables included in the study, except for race, are related to student's performance. However, existing relations were weak.

Seeking to contribute to the identification of possible variables that explain the negative influence on student performance, the research of Araújo et al. (2013) used Accounting student's data from an HEI located in Belo Horizonte, MG, the fourth largest city in Brazil. The goal was to identify if academic performance, measured by the final grade in a given discipline, is explained by the following variables: class attendance, age, gender, nature of the discipline, type of discipline, the situation at the end of the discipline, school period and campus. In summary, the authors found that

the increased absence rate, female students, older age, and term progress presented positive performance. For campus II (subsidiary) students, quantitative disciplines and higher discipline status presented negative performance.

Reis et al. (2017) analyzed anxiety among Accounting students from a Brazilian public university, aiming to verify whether it is significantly associated with academic performance. The main results indicate that students presenting higher anxiety levels in everyday life tend to get more anxious than their peers in moments of evaluation. The research also found that women tend to present higher levels of anxiety than men; and that more anxious students who were nearing the end of the course, males, that did not participate in academic activities, tend to present lower academic performance than their peers.

Based on the information discussed, we note that student performance relates to several personal, social, psychological, demographic, among other variables, and may be influenced positively by them. This topic has been researched from various angles.

2.2. Emergency remote teaching

The rise of emergency remote teaching (ERT) should consider the evolution of distance learning (DL). According to Silva (2015), some studies point to the eighteenth century as the first experiences using distance learning, gaining traction from the nineteenth century onwards. At first, DL was characterized by the use of printed correspondence via mail and pupils studying on their own. Subsequently, it used telecommunications. Currently, it is based on the Internet, expanding greatly (Bizarria et al., 2015).

In Brazil, distance learning was legally established by article 80 of law no. 9.324, of December 20, 1996, which is regulated by Decree 9.057, of May 25, 2017. According to these, DL can be mediated through processes with the use of "information and communication technologies, with qualified personnel, access policies, compatible monitoring, and evaluation, among others, and to develop educational activities by students and education professionals who are in different places and times" (Decreto 9.057, 2017, art. 1).

With technological advancement, DL relates to the contemporary world in serving quickly and punctually the needs of everyday life. The use of computer science shifted paradigms by creating numerous possibilities, overcoming or reviewing teaching models already in use. With the advancement of technology also comes virtual learning environments (VLE), spaces where users create educational situations as in the face-to-face world through computational devices. Schedule flexibility, synchro-

nous or asynchronous activities, dynamism, digital teaching materials, and not having boundaries are some of the highlighted advantages (Machado, 2010).

Gusso et al. (2020) point out that DL requires "careful planning of both programs and disciplines, along with management systems and work processes developed by a multidisciplinary team (teachers, computer technicians, pedagogues, managers, among others.) that can provide the suitable guidance and support for this type of work" (p. 5). Thus, DL is regulated by legislation and requires a particular structure preceding its implementation.

The COVID-19 pandemic scenario causes the need for emergency remote teaching with fully online activities, which, according to Gusso et al. (2020), is not a defined border defined for DL. Consequently, HEI have adapted face-to-face education for emergency remote teaching.

Ferreira Neto et al. (2021) carried out a study regarding student perception of the educational processes amid the pandemic. The presented results highlight that it is still necessary to make adjustments for remote education to be successful. It cites the need for technological resources and knowledge in active methodologies as tools to meet different student skills.

Moreira, Henriques, and Barros' study (2020) considers the scenario in which, with the abrupt arrival of the virus, "educational institutions and teachers were forced to adopt distance learning and emergency remote teaching practices. However, these are significantly different from digital education practices" (p. 351). It also briefly presents basic principles to be followed by teachers in online environments, such as the organization of the digital environment, communication, selection of technologies, and evaluation of digital activities. These principles collaborate with the transition of teaching by providing direction and assistance more quickly, which is the need of remote teaching.

Schmitt et al. (2021) identified the adaptations of teaching-learning strategies in the perception of 52 teachers from Administration, Accounting Sciences and Economics, in 4 HEI in Southern Brazil during social isolation. The perceptions of the teaching process, as well as the teaching-learning strategies used for remote lessons, were collected from a 32-question questionnaire. The results show teachers were surprised regarding the possibility of adapting teaching methodologies used in the face-to-face model and aggregate it to the technologies. The study also shows teachers' perception towards their students, pointing out difficulties in interaction when not participat-

ing with video or microphone and difficulties in access regarding the limitations of students' Internet quality.

Given the transformations the teaching model underwent due to social isolation, it is necessary to note that teachers would require emergency remote teaching training. Oliveira et al. (2020) discussed the training offered by a private school regarding the continuity of classes during the pandemic and instrumentalization of digital technologies. They observed the need for training beyond tools; to create groups where teachers' can share experiences to leverage both teaching and learning.

In an account of student experiences of the Federal University of Santa Maria (UFSM), Southern Brazil, about remote education during the pandemic, Silveira et al. (2021) highlight advantages and disadvantages. The main advantages are schedule flexibility and the possibility of studying anywhere. Disadvantages are the lack of face-to-face contact between teachers and peers, less interaction, and the need for autonomy and greater responsibility for one's studies. Students also report other disadvantages, such as Internet connection speed, laziness in performing tasks, and lack of a suitable location, causing distraction.

Rondini et al. (2020) analyzed 170 teachers of São Paulo State to understand the challenges that the pandemic imposed on their practice. The authors note that emergency remote teaching differs from DL, because "it presents features and a multiprofessional team prepared to offer pedagogical contents and activities through different media on online platforms" (p. 43). There was a rapid adaptation and recurring difficulties from the face-to-face model that worsened in DL. However, with the transposition of face-to-face teaching to remote settings, teachers have indicated how the use of digital information and communication technologies is both challenging and enriching for teaching practice. While they were used mainly as support tools, they now figure predominantly as the main object.

As shown, remote emergency teaching (RET) is not entirely separated from DL, the latter based on a validated conceptual framework. RET is an adapted response in which institutions and teachers had to accommodate classes and uncover new ways to transpose the content and practices adopted in face-to-face learning to technology. For that purpose, they interacted with and learned to use new technologies to perpetuate education during social distancing regarding the COVID-19 pandemic.

3. Methodological procedures

This is a descriptive research. The aim of this research is to analyze the variation of academic performance from undergraduate students enrolled in the Accounting Sciences program of a public federal university in Southern Brazil between the academic semesters of 2019/2 and 2020/1 after the implementation of emergency remote teaching. Raupp and Beuren (2009) characterize descriptive research as an intermediate between exploratory and explanatory research. In this context, "to describe means identifying, reporting, comparing, among other aspects" (p. 81).

This research is quantitative in nature. For Martins and Theóphilo (2016) this type of research emphasizes quantitative evaluation by measuring variables. Raupp and Beuren (2009) characterized quantitative research by using statistical tests in treatment and analyzing data, with particular attention to ensuring the accuracy of results.

Regarding its procedures, this research can be considered a documentary research with a secondary data source. "First hand" documentary research characterized by Gil (2002) as "using materials that have not yet received analytical treatment or that can still be re-examined with the objective of the research" (p. 45). They consider research with secondary data in which the documents have been previously analyzed in some way, for instance: search reports, business reports, among others.

The universe of the research was composed of the performance coefficient of 388 undergraduate students from Accounting Sciences program of a federal public higher education institution located in the state of Rio Grande do Sul, Southern Brazil, enrolled in 2020/1. In the analyzed HEI, the performance coefficient mirrors the weighted average of the student's final grades at the end of each school cycle. This measure was also used in Costa's study (2020).

Data collection occurred in March 2021 through the university system. In it, reports containing data from enrolled students, teachers, and program coordinators are made available. First, we collected data from the students of the 2019/2 and 2020/1 academic semesters. We then confronted this data, ensuring the relation of the same student for the two semesters. From the research universe, 107 students' data was discarded. These refer to students who were enrolled in the 2019/2 semester but did not enroll or were starting their studies in 2020/1. Therefore, we would not be able to two compare the semesters in terms of performance. After disposals, the sample has data from 281 students total.

From these students, we collected the following information: registration number, age, gender, enrollment semester, and performance coefficient. This data was then systematized and tabulated in a spreadsheet. We employed a set of statistical tests for the quantitative data analysis technique: the Shapiro-Wilk test, the Wilcoxon test, the Mann-Whitney U test, and the Kruskal-Wallis test. Also, we used the Statistical Package for the Social Sciences (SPSS) software.

The Shapiro-Wilk test is used to test the normality of the data, based on Shapiro and Wilk (1965). It is applied to samples with n higher than 100, assuming as a null hypothesis the normal distribution population sample. For the Shapiro-Wilk test, the following H0 hypotheses were considered: p-value >0.05 indicating normal distribution; and alternative hypothesis (H_a): p-value <0.05, indicating that data distribution is not normal. Therefore, for this study the sample with p <0.05 indicates the rejection of the null hypothesis—that is, the data does not have a normal distribution.

The Wilcoxon test, corresponding to the signal test (the statistical method for testing differences between pairs of observations), is an alternative statistical test when the data distribution does not display normal distribution. In this non-parametric hypothesis test, the goal is to compare two samples related to a single sample in order to assess whether the population location differs (Fávero & Belfiore, 2017; Wilcoxon, 1945). In order to verify that the variables gender, age, and enrollment semester are relating to student performance, we calculated the Mann-Whitney and Kruskal-Wallis tests.

In the Mann-Whitney test, the aim is to compare two independent groups evaluated by means of an ordinal qualitative—that is, a quality that has an order. The populations' medians are tested in this bilateral test. The null hypothesis is due to the equality of these medians. (Fávero & Belfiore, 2017). The Kruskal-Wallis test aims to verify that the samples originates from the same population and can determine whether there are statistically significant differences between groups. This test is used to compare two or more equal or differentially sized independent samples. (Fávero & Belfiore, 2017; Leard Statistics, 2021).

4. Results

In this section we describe and analyze the study's data. Initially, table 1 presents the sample profile, composed of students of the undergraduate program in Accounting Sciences. Subsequently, the descriptive analysis is presented.

Table 1. Sample profile

Variables	Alternatives	Frequency	Percentage
1. Gender	Male	109	38,80%
	Female	172	61,20%
	TOTAL	281	100%
2. Age	Under 20	1	0,40%
	Between 20 and 29	183	65,10%
	Between 30 and 39	69	24,60%
	Between 40 and 49	21	7,50%
	Between 50 and 59	6	2,10%
	Above 60	1	0,40%
	TOTAL	281	100%
3. Enrollment semester	2012/2	1	0,40%
	2013/1	3	1,10%
	2013/2	3	1,10%
	2014/1	9	3,20%
	2014/2	8	2,80%
	2015/1	8	2,80%
	2015/2	12	4,30%
	2016/1	19	6,80%
	2016/2	17	6,00%
	2017/1	31	11,00%
	2017/2	29	10,30%
	2018/1	65	23,10%
	2018/2	0	0%
	2019/2	76	27,00%
TOTAL		**281**	**100%**

Regarding the variable gender, the highest concentration is women, representing 61,20% of the sample (172 students enrolled in the analyzed period), followed by 38,80% male students. Women are a majority in Accounting Sciences programs, a fact also proven in Costa's study (2020).

For the age variable, we highlight the age group containing students between 20 and 29 years old, representing 65,10% of total students. It is possible to note that the higher concentration of students belongs to Generation Y, also known as the millennium generation—born between 1980 and 2000. This coincides with Farias and Carvalho's findings (2016), which point to Generation Y as the majority of higher education students. Concerning enrollment semester, the frequency between 2012/2 and 2017/2 does not present significant variation. The semesters 2018/1 and 2019/1 are highlighted with greater representativeness, presenting 65 students (23,10%) and 76 students (27%), respectively.

For the subsequent step of the study, which consists of the estimation of statistical tests, it was necessary to identify if normal distribution is present in the sample. As described in the previous session, the Shapiro-Wilk normality test was performed, which presented a p-value of 0,000 for both samples. This result indicates that the distribution of the data is not normal (asymmetric) and can be confirmed in the following histograms (figures 1 and 2), rejecting the null hypothesis (H_0). As a result, we chose the estimation of non-parametric tests for this study's data.

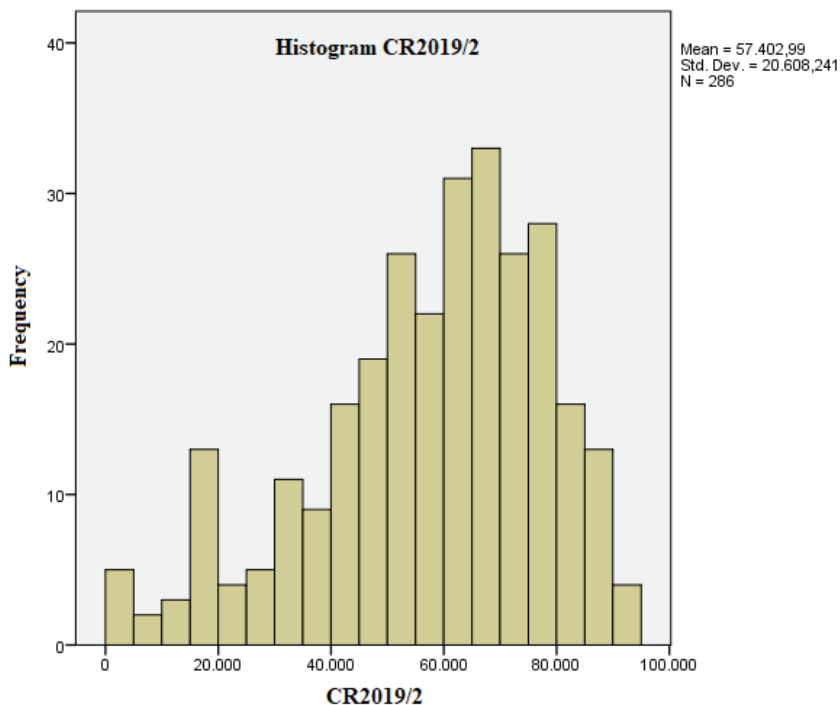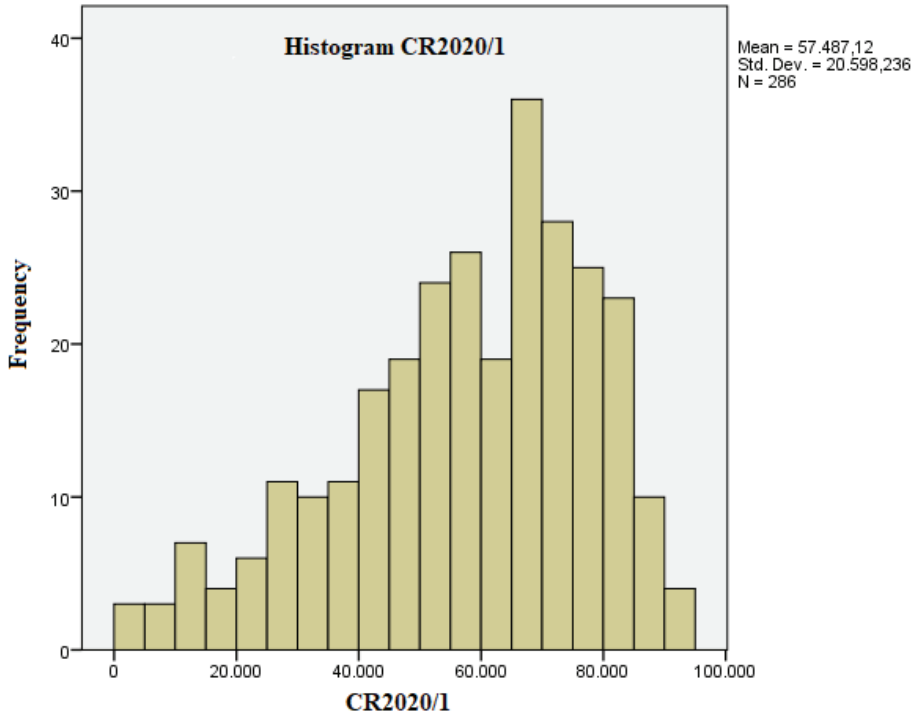**Figure 1. 2019/2 Performance coefficient histogram**

Figure 2. 2020/1 Performance coefficient histogram

After verifying data normality, as shown in figures 1 and 2, the descriptive statistics of yield coefficients were analyzed in both periods (2019/2 and 2020/1), as shown in table 2.

Table 2. Descriptive statistics of student performance and Wilcoxon test

Variable	Descriptive statistics					Wilcoxon test	
	(n)	Mean	Min.	Max.	SD	Test value	Sig.
2019/2 Performance C.	281	58,424	7,500	94,000	19,297	-1,021	0,307
2020/1 Performance C.	281	58,446	5,444	92,222	19,458		

Table 2 presents the descriptive statistics for the student performance of the two analyzed semesters (2019/2 and 2020/1). The 2019/2 semester data presented a mean of 58,424, similar to the 2020/1 semester, whose mean was 58,446. As such, it was possible to identify a positive difference. The minimum values obtained for the yield mean were 7,50 and 5,44 in 2019/2 and 2020/1, respectively. The maximum values, in turn, were

94,000 in the first analyzed period and 92,222 in the pandemic period. The means of student performance present a standard deviation of 19,297 and 19,458 in the analyzed periods, respectively.

We performed the Wilcoxon test to compare the two related samples and verify that the differences encountered between the student performance of both semesters are statistically significant. For the Wilcoxon test, we considered two hypotheses. H_0 (p-value >0,05) indicates that the difference between variables is equal to zero, and there is no difference between yield coefficients. Alternative hypothesis H_a (p-value <0,05) shows that the difference between variables is different from zero, and there is a difference between the comparison of the student performance of the two semesters. The Wilcoxon test revealed that the difference between yield coefficients on both periods is not statistically significant (Z = -1,021; p> 0,05). Thus, the null hypothesis (H_0) was not rejected, indicating that there is no difference between the analyzed means.

On account of the teaching be adapted to a remote setting, we expected the non-rejection of the alternative hypothesis. According to Reis et al. (2017), Araújo et al. (2013), Silva and Oliveira Neto (2010), the alterations incurred due to social isolation in variables of many areas (personal, social, economic, technological, psychological, to name a few) could impact student performance. Such hypothesis rejection can be explained by two aspects: (i) the fact that teachers were able to adapt to the new conditions, causing the students to support the performance level; (ii) teachers may have had flexibility in how to assess and convey pedagogical content so that students could also adapt to remote education and achieve the proposed tasks. The subsequent stage of this study consisted in testing to understand the relationship of gender, age, and enrollment semester on the students' performance. The Mann-Whitney test (1) was used for the gender variable for having two response alternatives (female and male). We used the Kruskal-Wallis (2) test for the variables age and enrollment semester since they present more than two response options (groups). The results are presented in table 3.

Table 3. Difference tests of student performance

Variable	2019/2 Performance C.		2020/1 Performance C.	
	Test value	Sig.	Test value	Sig.
Gender (1)	9272.000	0,878	9256.000	0,859
Age (2)	3.567 (5) *	0,613	3.261 (5) *	0,660
Enrollment semester (2)	56.828 (12) *	0,000	51.754 (12) *	0,000

* Indicates the number of degrees of freedom

The Mann-Whitney test, applied to the gender variable, considered the following hypotheses: H_0: indicates that the difference between variables is equal to zero (there is no difference), presenting a p-value >0,05. H_a: indicates that the difference between variables is different from zero (there is a difference); p-value <0,05. Thus, according to the results demonstrated for the two semesters, 2019/2 (Z = -0,153; p >0,05) and 2020/1 (Z = -0,178; p >0,05), gender has no relation to student performance. An opposed result is highlighted by Araújo et al. (2013) which note female students presenting higher grades than male students.

As discussed previously, the age and enrollment semester variables were estimated using the Kruskal-Wallis test, since these variables are composed of more than two groups. In the Kruskal-Wallis test, the null hypothesis (H_0) indicates that the difference between the variables is equal to zero (there is no difference) with p-value> 0,05. The alternative hypothesis (H_a) indicates that the difference between the variables is different from zero (there is a difference) with p-value <0,05.

This result is opposite from those found by Araújo et al. (2014), which suggests that performance tends to improve with increasing student age. For this study, test estimation showed no effect of age on student performance for both semesters, 2019/2 [X^2 (5) = 3,567; p >0,05] and 2020/1 [X^2 (5) = 3,261; p >0,05], not rejecting the null hypothesis.

The Kruskal-Wallis test was also applied to the enrollment semester variable and showed a relation between enrollment semester and student performance in 2019/2 [X^2 (12) = 56,828; p <0001] and 2020/1 [X^2 (12) = 51,754; p <0,001], thus rejecting the null hypothesis. Based on this result alone, we cannot determine which enrollment semester is related to the student performance. As such, we carried out post-hoc pairwise comparisons to identify statistically significant differences (p <0,05) between student performance and enrollment semester.

The post-hoc estimation regarding the 2019/1 performance indicated statistically significant differences between the semester groups of a) 2014/1 and 2017/1; b) 2014/1 and 2017/2; c) 2014/2 and 2017/2; d) 2015/2 and 2017/1; e) 2015/2 and 2017/2; f) 2016/1 and 2017/2; g) 2019/1 and 2017/1; h) 2019/2 and 2017/2. The student performance of the 2020/1 semester also presented statistically significant differences between the enrollment semester: a) 2014/1 and 2017/1; b) 2014/1 and 2017/2; c) 2015/1 and 2017/2; d) 2016/1 and 2017/2; e) 2019/1 and 2017/1; f) 2019/1 and 2017/2.

It should be noted that the post-hoc analysis results showed that significant differences between pairs have in common both semesters of 2017. By analyzing 2017

students and considering that these are enrolled in last-year disciplines and completing their final term papers, these may have traveled different routes from the other students. These students may present higher scores by having understood the need to adapt due to the pandemic onset and proximity of graduation by 2020/2. They are also familiar with the norms and procedures adopted by the HEI, thus having a better understanding of the new processes. Another possible explication is that factors that influenced their lives during the pandemic impacted their performance scores. Here we can highlight, for instance, the fact that the HEI paused classes after the first week of the 2020/1 school semester, at the onset of the pandemic, returning in emergency remote teaching only after five months. Regarding the enrollment semester variable, future qualitative research should be carried out to explore other aspects, thus clarifying the impact of enrollment semester on student performance.

5. Final considerations

This study aimed to analyze the variation of academic performance after the implementation of emergency remote education from undergraduate Accounting Sciences students of a public, federal university of Southern Brazil between the academic semesters of 2019/2 and 2020/1. The analyzed semesters correspond to the period HEI were adapting new rules due to the emergency period imposed by the social isolation due to the COVID-19 pandemic. Statistical analysis of student performance indicated that, overall, the implementation of emergency remote education did not influence the academic performance of the students. However, analyzing enrollment semesters showed variation in student performance from students enrolled in 2017. We recommend further analysis to clarify why it presented significant variation during the analyzed period.

Overall, the results of this research may indicate that the change to emergency remote teaching did not present variation in the student performance. This study presents an innovative aspect, for previous studies focusing on the pandemic period have not yet presented results such as the one this research brings to light.

After the analysis of this study, with data from students who attended the previous periods and the pandemic onset, we can make positive considerations. The studies of Ferreira Neto et al. (2021), and Silveira et al. (2021) present results that show students consider the need for adjustments related to emergency remote education. However, the changes adopted in the teaching practices, as stated by Moreira, Henriques, and Barros (2020), Rondini et al. (2020), and Schmitt et al. (2021), are managing to maintain student performance.

This research limitation is that the change to emergency remote teaching is not the only variable influencing student performance. Factors such as family income, access to technology, teacher training for the emergency period, online teaching methodologies may influence student performance throughout the program. Other factors not examined in this study may also impact student performance. In addition, the study was restricted to quantitative analyzes of two semesters in a single HEI. For future research, we suggest expanding the analyzed semesters, the comparison between educational institutions, and also the addition of new variables, such as racial quota students, family income, and access to technology. We also suggest a qualitative approach.

Contribución de autores

Correa, E.: Conceptualización, Metodología, Análisis formal, Investigación, Curación de datos, Redacción borrador original. **Gomes, D.:** Validación, Supervisión, Administración del proyecto. **Amado, P.:** Software, Validación, Análisis formal. **Nunes, W. y Costa, A.:** Supervisión.

Everson Correa Vasoncelos – Correa, E.

Débora Gomes de Gomes – Gomes, D.

Pâmela Amado Tristão – Amado, P.

Walter Nunes Oleiro – Nunes, W.

Alexandre Costa Quintana – Costa, A.

Declaración de conflicto de intereses

El (los) autor(es) declara(n) que, durante el proceso de investigación, no ha existido ningún tipo de interés personal, profesional o económico que haya podido influenciar el juicio y/o accionar de los investigadores al momento de elaborar y publicar el presente artículo.

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