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INFLUENCE OF EMERGENCY REMOTE EDUCATION IN CIVIL ENGINEERING IN THE FACE OF THE PHENOMENON OF EVASION: A STUDY IN IFPB - *CAMPUS* PATOS

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INFLUÊNCIA DO ENSINO REMOTO EMERGENCIAL NA ENGENHARIA CIVIL FRENTE AO FENÔMENO DA EVASÃO: UM ESTUDO NO IFPB - *CAMPUS* PATOS

Resumo

Objetivo: Analisar os fatores que acometeram às taxas de evasão universitária no curso de bacharelado em Engenharia Civil do Instituto Federal da Paraíba (IFPB) – *campus* Patos tendo em vista o ensino remoto emergencial ocasionado pela pandemia da COVID-19. **Design | Metodologia | Abordagem:** O público-alvo foram os 93 alunos evadidos do curso de Bacharelado em Engenharia Civil do IFPB, *campus* Patos, no período de 2020-2021, porém, a pesquisa contou com 68 respondentes (survey). **Resultados:** O processo pandêmico intensificou as taxas de evasões universitárias que já vinham em estado alarmante, mesmo com adoção do ensino remoto, este não chegou para toda a comunidade, nem com qualidade adequada. No curso de engenharia analisado por este estudo, encontrou-se uma taxa de evasão universitária, tendo em vista o período de aulas remotas, de aproximadamente 38%. Diversos fatores estão por trás desta questão, como as desigualdades sociais geradas pela pandemia, como fatores pessoais e institucionais os quais impulsionaram o discente a evadir do seu curso. **Originalidade | Valor:** Este estudo se mostra como pioneiro no IFPB frente aos desafios já enfrentados pela evasão universitária. Nesse viés, demonstra a urgência pela tomada de medidas que mitiguem as consequências geradas para com o público mais vulnerável afetado.

Palavra-chave: Ensino remoto, COVID-19, Taxa de evasão.

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Abstract

Goal: Analyze the factors that affected university dropout rates in the Bachelor's Degree in Civil Engineering at the Federal Institute of Paraíba (IFPB) - *campus* Patos, in view of the emergency remote teaching caused by the COVID-19 pandemic. **Design | Methodology | Approach:** The target audience were the 93 students who dropped out of the Bachelor's Degree in Civil Engineering course at the IFPB, *campus* Patos, in the period 2020-2021, however, the survey had 68 respondents. **Results:** The pandemic process intensified the rates of university dropouts that were already in an alarming state. Even with the adoption of remote teaching, this did not reach the entire community, nor with adequate quality. In the engineering course analyzed by this study, a university dropout rate was found, considering the period of remote classes, of approximately 38%. Several factors are behind this issue, such as the social inequalities generated by the pandemic, as well as personal and institutional factors that pushed students to drop out of their course. **Originality | Value:** This study is a pioneer in IFPB in the face of the challenges already faced by university evasion. Following this bias, it is demonstrated the urgency of taking measures that mitigate the consequences generated for the most vulnerable affected public.

Keywords: Remote learning, COVID-19, Dropout rate.

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1. Introduction

Engineering teaching has challenges on a global scale. Socio Economic problems, from issues related to the pedagogical format itself adopted in non-compartmentalized engineering schools, such as the achievement of technological advances, to issues related to demotivation, generated by academic-social difficulty during the course, have driven more and more students in the process of disapproval in disciplines and, consequently, excluding them from the educational system (Gottlieb, Utesch & Böhm, 2019). According to Behr, Giese, Kamdjou and Theune (2021), this factor has worried several scholars, given that the inefficient use of resources that promote motivation and mitigate the problem have resulted in students' dissatisfaction, as they do not achieve their educational objectives, affecting significantly rates of evasions in recent years.

In Brazil, a country of continental dimensions, these factors are more aggravating, considering that Brazilian education is marked by socioeconomic difficulties rooted in the community context, resulting in obstacles to various sectors of the country and, consequently, to the Brazilian citizen. For Quispe-Prieto, Cavalcanti-Bandos, Caipa-Ramos, Paucar-Caceres and Rojas-Jiménez (2021), schooling is characterized as one of the means of social ascension of the individual to guarantee dignity and occupation status through income earned from it. However, specifically, access to higher education due to historical factors is predestined, in the vast majority of cases, for individual portions and higher social strata, but when this access is affected by students with social vulnerabilities or low-income families from the country's public education, higher education rates are evidenced through the requesting leaves of disciplines, failures or even academic exclusions from these (Bardach, Lüftenegger, Lüftenegger, Spiel & Schober, 2020).

International Journal of Knowledge Engineering and Management,
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For the National Institute of Educational Studies and Research Anísio Teixeira (INEP), an agency linked to the Brazilian Ministry of Education (MEC), which has the responsibility to act in educational actions that take place in Brazil in order to help the development of the country and, among other functions, has an essential role in the Brazilian educational mapping, school dropout is defined as the act taken by the student to leave the institution without prior return, with early departure before completing the level of education studied, characterizing itself as a temporary condition of failure, with regard to the expansion and acquisition of knowledge cognitive skills and skills desired by the student concerned (Brasil, 2017).

In March 2020, with the advent of the COVID-19 pandemic, the indexes presented by several studies showed that there was a worsening of evasions already previously evidenced by higher education institutions (Bardach et al., 2020; García-Alberti, Suárez, Chiyón & Feijoo, 2021). The pandemic health emergency forced educational institutions to modify their face-to-face methods and promote new strategies to accompany learning through virtual teaching platforms. Most schools did what was possible to adjust and apply the digital systems needed in order to not delay learning and lead to greater losses (García-Alberti et al*.,* 2021). However, despite necessary, what was noticed was that academies were not prepared to preside over such a sudden shift to emergency remote education.

It is in this thematic sphere that this work is included, which took as object of study the bachelor's degree course in Civil Engineering at IFPB – *campus* Patos, aiming to analyze the factors that related to the university evasion rates of the said civil engineering course during the COVID-19 pandemic. In order to meet the general objective, the following specific objectives were established: a) To know the profile of the students evaded from the Civil Engineering course of IFPB - *campus* Patos; b) To identify the main factors that are part of the act of school dropout by the students; c) To verify the opinion of the students on issues related to the Institution during the COVID-19 pandemic; d) To identify solutions pointed out

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by the students regarding the process of combating evasion and that can assist the IFPB in mitigating measures of this impasse.

2. Methodology

This study is an exploratory-descriptive research (according to its most general objectives), with a quantitative approach. Exploratory research aims to provide greater familiarity with the research problem. Its planning tends to be very flexible, because it is interesting to consider the most varied aspects related to the phenomenon studied. Descriptive research aims to represent the characteristics of a given population, such as the ones that aim to raise opinions, attitudes and beliefs of a population (Gil, 2017).

Quantitative research involves numerical data and employs statistical techniques to classify and analyze them. As for technical procedures, this research is classified as a field survey – characterized when people are questioned directly to become better acquainted. It is a request for the personal and professional information of each member of the population about the problem being studied, and then, through quantitative analysis, the conclusions corresponding to the collected data are obtained (Gil, 2017).

The research was carried out at IFPB – *campus* Patos in the Bachelor of Civil Engineering course. The target audience of the study was all students (2019.2, 2020.1, 2020.2, 2021.1 and 2021.2) evaded from the Bachelor's degree in Civil Engineering course at the *campus* Patos during the COVID-19 pandemic period. In this sense, the school years analyzed by the project team are 2020.1 (1st and 2nd terms), 2020.2 (1st, 2nd and 3rd terms), 2021.1 (1st, 2nd, 3rd and 4th terms) and 2021.2 (1st, 2nd, 3rd, 4th and 5th terms) - terms with remote classes during the Coronavirus pandemic.

International Journal of Knowledge Engineering and Management,
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Therefore, the methodology developed in the work has the activities divided into four distinct stages, being: 1) Review, 2) Surveys, 3) Data Analysis and 4) Finalization. Both goals are divided according to the nature and volume of planned activities.

In the first phase of the project both the bibliographic research and the literature review were performed. The project database was assembled with the separation between authors related to educational practice in basic education and its influence with higher education in engineering, especially civil engineering, as well as the process of circumvention in engineering courses and recent materials published in the literature about combat techniques already used by scholars.

In the second stage, it was the moment dedicated to the survey data collection that comprises indirect data collection and direct data collection. After the approval of this work by the IFPB Research Ethics Committee (Opinion Number: 5.478.386 and Certificate of Presentation of Ethical Appreciation - CAAE: 58122822.7.0000.5185), data collection was initiated (direct and indirect collection), performed virtually due to the moment of pandemic experienced by the research, avoiding direct contact between researchers/researchees. Indirect collection included the collection of academic and personal data of evaded students, via IFPB academic coordination. Direct data collection consisted of the application of a questionnaire, which was elaborated via Google Forms and the link turned available to students via email. The direct data collection instrument was applied by Google Forms, which had been divided into four parts, to know: a) About the evaded student (sociodemographic questionnaire), b) Exogenous questions (external motivations to the institution – personal), c) Endogenous questions (institutional motivations) and d) Possible solutions.

Data analysis was performed in two phases: a) tabulation and b) analyses. Microsoft Excel and SPSS statistical software (16th version) were used to tabulate and process the data. To test the possible association between the qualitative variables, the Chi-square Tests of

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Independence and the Fisher's Exact Test were applied, both evaluating the null hypothesis that the two variables are independent (p-value > 0.05) against the alternative hypothesis that there is a significant association between them (p-value < 0.05). In the comparison between the total amount of personal reasons for the evasion, compared with the total number of reasons related to the institution, the assumption of normality was first evaluated by means of the Kolmogorov-Smirnov test and then the Wilcoxon test was applied to evaluate the null hypothesis that the two groups did not differ significantly (p-value <0.05). In all statistical tests used, the level of 5% significance was considered. For more theoretical details, see Bussab and Morettin (2006).

The fourth stage corresponded to the preparation of the document that contemplated the description of the stages taken and the main results evidenced from the analysis of the data collected. From the management of the results, records, impressions and considerations were organized to examine the fulfillment of the intended objectives.

3. Results and Discussions

IFPB promotes free of charge and high quality public education in the state of Paraiba, with technical, technological, bachelor's, teaching licenses and postgraduate courses. Specifically, in the *campus* of the city of Patos - PB, the institution has fourteen courses with different teaching modalities, both distance learning and the face-to-face modalities. Among them, nine are technical courses, two are of higher education and three are characterized as *Lato Sensu* specializations.

This investigation, specifically, took as the object of study the bachelor's degree in Civil Engineering course of this *campus*, in view of the increasing rate of evasion during the covid-19 pandemic. The course was instituted on that *campus* through resolution number 42 on 24

International Journal of Knowledge Engineering and Management,
Florianópolis, v. 11, n. 30, p. 129 – 158, 2022.
• ISSN 2316-6517 •
• DOI: 1029327 •

October 2018. The resolution determines the operation of the Civil Engineering course as full-time, that can be performed in the morning and afternoon shifts, in the same way that it is determined a total workload of 3988 hours for the training of students. However, the first term of the course was only offered in the second half of 2019 (2019.2). Annually, 80 vacancies are offered through the Unified Selection System (SISU), The Selection Process of Higher Courses (PSCS) and special selection process (PSE) depending on the demand, with forty of these vacancies destined for the first semester and the other forty vacancies for the second semester. Currently, the Bachelor's degree in Civil Engineering course of said *campus* meets seven school terms happening in a mutual way.

In the time period used by the research (period of remote classes in the IFPB between 2020-2021), data from the academic system of IFPB – *campus* Patos show that in the recent bachelor's degree course in Civil Engineering of that *campus* the number of students enrolled in the course was 187 students. For this growing rate of enrolled in the recent engineering course, as exemplified in Table 1, the dropout rate during remote classes is approximately 38%. That is, from the Civil Engineering course, ninety-three (93) students evaded during the period of remote classes evidenced by the COVID-19 pandemic at the institute.

International Journal of Knowledge Engineering and Management,
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Table 1 - List of evasion in the civil engineering course of IFPB - *campus* Patos during the four semesters on the rise of the COVID-19 pandemic.

SEMESTERS	ANALYZED TIME PERIOD				GENDER	
	2020.1	2020.2	2021.1	2021.2	M	F
2019.2	7	3	2	5	15	2
2020.1	3	18	2	4	21	6
2020.2	-	8	8	9	19	6
2021.1	-	-	5	9	8	6
2021.2	-	-	-	10	6	4
TOTAL PER SEMESTER	10	29	17	37	69	24
TOTAL EVADED					93	

Source: Prepared by the authors (2022).

To obtain this dropout rate, this study took as guiding principle the definition best accepted by the theorists of the area, which define university dropout as the process of dropping out of courses without completion at any stage, being a direct consequence of the student decision based on their own motivations, financial issues and personal or school factors - curricular structure, pedagogy adopted that drives it to disinterest (Ramberg, Laftman, Frasson & Modin, 2019).

From this perspective, the data obtained by the research corroborate the multiple studies recently published on engineering evasion (Behr et al., 2021; Olmedo-Cifuentes & Martínez-León, 2022; Rapanta, Botturi, Goodyear, Guàrdia & Koole, 2020), emphasizing the high rate of dropout in the courses of exact sciences and engineering. According to Mireles-Rios, Rios and Reyes (2020), there are several reasons that can lead the academic to drop out. For the authors, the justifications for the phenomenon may be endogenous, related to factors of the

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• DOI: 1029327 •

HEI, such as lack of qualified professors, physical structures, practical classes, among others, or exogenous, related to the personal aspects of the student.

In this perspective, as stated by Cunha, Vidal, Tiegs and Tiegs (2021, p. 495), "knowing the students who are enrolled can be one of the ways to avoid further dropouts". Thus, initially it was sought to find the characteristics that describe, on average, the students who evaded the Civil Engineering course of the said Patos *campus*. Moreover, the authors' work describes that several may be the reasons that lead students to escape undergraduate courses.

3.1. Knowing the profile of the evaded student

The present research, due to their free participation, could not contact all the 93 students who were in a situation of evasion of the mentioned Civil Engineering course, however many who were sought, kindly answered the questionnaire, thus helping to understand the subject of university evasion. Therefore, we could count on the participation of a total of 68 dropout students. Of this total number of participants, 73.5% are men and 26.5% are women, which further demonstrates a predominantly male demand for engineering courses (Freitas, Costa & Costa, 2017). Table 2 Below prints the results described here.

Through the collected data, it was noticed that, in general, the evaded student was an average of 23.9 years, living with on average 2 people, mainly male (73.5%), single (91.2%), dedicated exclusively to the study (44.1%), belonging mainly to the middle or middle-low class (75.0%), living in their own house (64.2%), in the urban area (91.2%), being brown (55.9%), considering themselves heterosexuals (79.1%), preferably coming from public school (73.5%) and in the form of entry by SISU (85.3%).

International Journal of Knowledge Engineering and Management,
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• DOI: 1029327 •

Table 2 – Distribution of absolute frequencies for qualitative variables

Factors	Variables	Number of answers	%
Gender	Male	50	73,5
	Female	18	26,5
Marital status	Single	62	91,2
	Married	6	8,8
	Divorced	0	0,0
	Widowed	0	0,0
Occupation	Study only	30	44,1
	Study and work at the opposite time	13	19,1
	Study and work in the other two free hours	25	36,8
Socioeconomic Level	Very high	0	0,0
	High	1	1,5
	Medium-high	2	2,9
	Medium	24	35,3
	Medium-low	27	39,7
	Low	13	19,1
	Very low	1	1,5
Type of housing	Own home	43	64,2
	Rented house	24	35,8
Housing zone	Urban	62	91,2
	Rural	6	8,8
Racial Identity	Black	6	8,8
	White	24	35,3
	Brown	38	55,9
	Yellow	0	0,0
	Indigenous	0	0,0
sexual orientation	Heterosexual	53	79,1
	Homosexual	4	6,0
	Bisexual	9	13,4
	Asexual	0	0,0
	Pansexual	1	1,5
	I prefer not to give an answer	0	0,0
Place of completion of high school	Public Institution	50	73,5
	Private Institution	17	25,0
	Public + Private	1	1,5
Form of entry	SISU	58	85,3
	PSE	2	2,9
	PSCS	8	11,8

Source: Prepared by the authors (2022).

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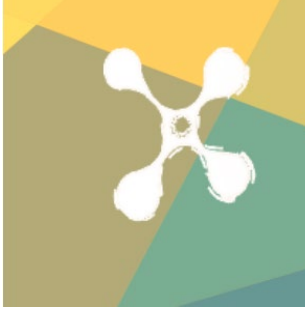
The data compiled show that, among the students surveyed in the Civil Engineering course offered by IFPB - *campus* Patos, it is an audience that originates mostly from public high schools. In addition, the entry into the newly engineering course of the *campus* Patos is mostly in the format of the Unified Selection System (SISU) (85,3 %). Right after, the freshmen appear through the Selection Process of Higher Education Courses (PSCS) (11,8%). However, the SISU becomes more decisive for admission because it is the selection that enables candidates of the whole country to compete for the vacancy, whereas in the case of institutional selection processes, there is a need for the student to be mostly from Paraíba state, most importantly, to have studied in the state of Paraiba. In this sense, the large number of freshmen from several states boost the change of course mainly to their states of origin, since the course of Civil Engineering at IFPB – *campus* Patos, although recent, presents significant competition, the cut-off score for entrance becomes high, which selects students from all over Brazil who presented the best results in the selection exam (Cunha et al., 2021).

In addition, since the topic transferings include both external and internal ones, when evaluating how SISU is applied, it is also understood why there is a higher percentage of external transfer. This is because, since in SISU process the first step is to obtain the score through Enem and only after the registration for the course is made, the chance of the student applying for a course that is not their preference is high (just because they reached the grade enough to enter in it), considering carrying out the classes for later trying to transfer to their course of interest (Freitas et al., 2017).

Although the course is already very diverse, according to the study, engineering is predominantly formed by the male sex. This factor is one of the greatest percussors of the rates of evasion in males being higher than the female sex, as for example in the results obtained by the present study. Despite the significant number of female students, compared to males, they remain more in the institution. According to Respondek, Seufert, Stupnisky and



International Journal of Knowledge Engineering and Management,
Florianópolis, v. 11, n. 30, p. 129 – 158, 2022.
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• DOI: 1029327 •

Nett (2017), this factor of lower predominance may be the motivating factor generated by the difficulty of entry to this portion of the population that motivates the permanence and until a possible completion of the course in the appropriate time.

For Larsen, Sommersel and Larsen (2013), when trying to understand the dropout in higher education courses, it is believed that the fact that the student does not initially identify with the course may be one of the motivators for future dropouts, because the lack of affinity with the disciplines of the course can generate, in addition to frustration, a poor performance in the evaluations. From this perspective, it is essential to understand both the profile of the students and what actually led them to evade from the university level or even from the educational process in general. Throughout this research, it will be possible not only to understand the rates of evasion, but also to present the factors that caused these course evasions in order to offer directions in face of the challenges already faced by IFPB and other educational institutions in the country.

3.2 Difficulties affected by students during the COVID-19 pandemic

Knowing the high percentage of evasion (37.80%), it can be noted that this data reveals the magnitude of evasion in the Civil Engineering course of the said *campus*, which in only two years of foundation of the course, there was already an expressive dropout rate (approximately 100 evaded only during the COVID-19 pandemic). This high percentage of evasion occurred due to several endogenous and exogenous aspects, according to the students interviewed.

In terms of course options, for approximately 34% of the students interviewed, Civil Engineering was not their first option for university admission. Courses such as architecture, interior designer, dentistry and medicine were the focus of choice for students. This shows

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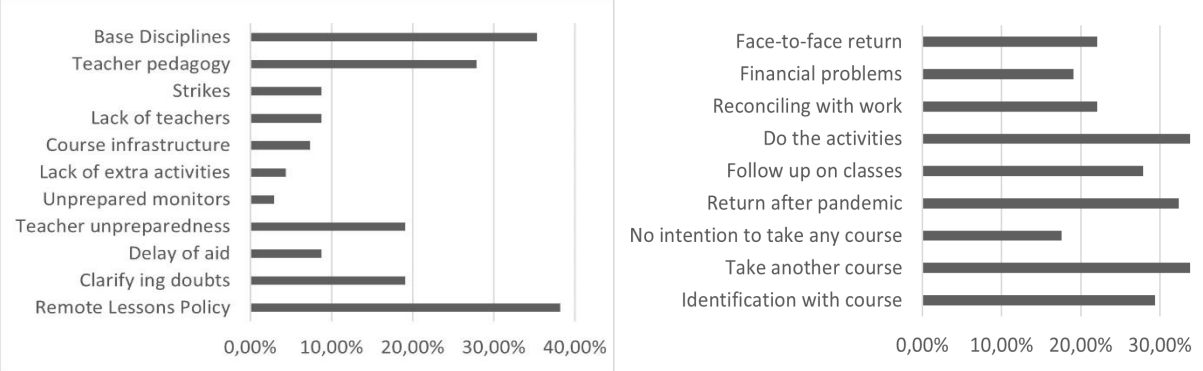
that professional indecision and lack of aptitude for the profession being initiated allows the student to evade in search of their real vocation (Lamers, Santos & Toassi, 2017).

For one third of the interviewees, the option to migrate from an institution and even take the first option is something plausible to be done or already accomplished, as shown in figure 1. The justification for this decision is argued by the majority by the fact that the style proposed for Non-Face-to-Face Classes (38.2%), difficulty with the basic disciplines of the course (Differential and Integral Calculus, Linear Algebra, Physics I, II and III) (35.3%), pedagogy of some professors of the civil engineering school (27.9%), the latter for several discussions, as evidenced by Nunes' study, Martins and Souza (2022), this fact is due to the traditional factor of the teaching process of the European school of passage from pedagogical practices from professor to student, it is worth remembering that many students without a direct contact with teaching disciplines.

Figure 1 - Main endogenous and exogenous reasons that drove evasion.



Source: Prepared by the authors (2022).

The percentage analysis above points to something very common in the Exact and Engineering courses: the difficulty and even disapproval in disciplines of the basic cycle of the courses because of concepts or insufficient grades for approval. In this sense, when analyzing

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• DOI: 1029327 •

the results of Silva and Silva (2019) and Bäulke et al. (2022) a common denominator is perceived: university evasion being directly linked to the demotivation generated by a supposed academic failure made possible by punctual lags in disciplines such as Physics and Calculations. Perhaps, this factor may be associated with a greater rigor, requirement and the didactic-pedagogical method of these courses.

This methodological model that places the roles of professors and students as isolated and hierarchical entities, rather than collaborative partners, is mainly due to the type of training of those professors who teach bachelor's degrees. Most of these professors come from technical degrees, without adequate preparation for teaching, and end up performing in classes the methodology they experienced as a student. As Nunes et al. (2022) describes, many preserve the belief that technological knowledge is superior to pedagogical issues, that it would be impossible to teach without the set of technical information acquired by the professor throughout his career. Despite true, it would also be inconceivable to teach without knowing how.

3.2.1. Comparative analyses between the variables analyzed

Comparing personal reasons and criticisms in relation to the educational institution, it was observed that personal reasons were significantly more relevant than institutional reasons (Wilcoxon, p-value < 0.05). Table 3 describes the results obtained.

International Journal of Knowledge Engineering and Management,
Florianópolis, v. 11, n. 30, p. 129 – 158, 2022.
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• DOI: 1029327 •

Table 3 - Comparison between personal and institutional reasons.

Factors	Personal Reasons	Institutional Reasons
Average	2,60	1,81
Standard deviation	1,488	1,863
CV (%)	57,2	103,0
Median	2,00	1,00
Minimum	1	0
Maximum	6	6
p-value Kolmogorov-Smirnov	0,002	
p-value Wilcoxon	0,003	

Source: Prepared by the authors (2022).

When analyzing the Influence of Gender on lack of identification and choice of course, the results collected, in both sexes, there was a higher percentage of individuals claiming that the lack of identification to the course would not be one of the motivations to evade it. Moreover, based on Fisher's Exact Test, the lack of identification with the course did not present a significant association with gender (p-value > 0.05), as shown in the following table (Table 4):

Table 4 - Association between gender and lack of identification with the course.

Factors		Lack of Identification with the course		Total	p-value
		No	Yes		
Male	n (%)	72,0	28,0	100,0	
Female	n (%)	66,7	33,3	100,0	0,765
Total	n (%)	70,6	29,4	100,0	

Source: Prepared by the authors (2022).

International Journal of Knowledge Engineering and Management,
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When evaluating the intention of the evaded in taking another course, it was noticed that those who want to take another course do not intend to return to doing Civil Engineering at the institution (100%). In addition, based on Fisher's Exact Test, the intention to take another course has a significant association with the desire to return to civil engineering at the institution (p-value <0.05), as shown in the following table (Table 5):

Table 5 - Association between remote classes and i want to change course.

Factors	Choice		I want to take another course		Total	p-value
			No	Yes		
Stopped and will return in the future for the same course of Civil Engineering	**No**	n (%)	73,3	100,0	82,4	0,006
	Yes	n (%)	26,7	0,0	17,6	
Total		n (%)	66,18	33,82	100,0	

Source: Prepared by the authors (2022).

With the notes raised by the research, it was noticeable that the COVID-19 pandemic developed and boosted, in most of the evaded, the desire to escape the course. According to the results collected, it was observed that 58% of those who showed interest in temporarily leaving the course, was due to the policies of non-face-to-face classes (AENPs) of the institution, but this relationship was not significant (p-value > 0.05). In other words, there was no significant association between these two variables. Therefore, this may be due to the virtual moment of teaching, considering the study conducted by Bardach et al. (2020) who emphasized that the better interaction and unity of the students of the classes in face-to-face teaching results in a greater motivation and support among the students, reducing the evasion.

International Journal of Knowledge Engineering and Management,
Florianópolis, v. 11, n. 30, p. 129 – 158, 2022.
• ISSN 2316-6517 •
• DOI: 1029327 •

In view of this scenario, it is expected that the rate of training in the face-to-face serial regimen will be higher.

Seeking to understand the evasion as a consequence of the need to work, due to the student not having any type of student assistance, it was noticed that of all those dedicated exclusively to studies (n=30) the vast majority (96.7%) did not indicate, as a reason for the evasion, lack or delay of student assistance policies. On the other hand, this trend was also followed among those who reconciled work and study. Moreover, the Chi-square Independence test did not have a significant association between occupation and student assistance policies (p-value > 0.05), demonstrating that disability evasion in these student policies was not associated with the occupation of the evaded. Table 6 below describes the results obtained.

Table 6 - Association between occupation and student assistance policies

Factors		lack/delay of student assistance policies		Total	p-value
		No	Yes		
Only studies	n (%)	96,7	3,3	100,0	
Studies and works at a time	n (%)	84,6	15,4	100,0	
Studies and works in the other two free times	n (%)	88,0	12,0	100,0	0,344
Total	n (%)	91,2	8,8	100,0	

Source: Prepared by the authors (2022).

International Journal of Knowledge Engineering and Management,
Florianópolis, v. 11, n. 30, p. 129 – 158, 2022.
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• DOI: 1029327 •

When relating to gender, it was perceived that of the total of those dedicated exclusively to studies (n=30), the majority (70%) were male. On the other hand, this trend was also repeated among those who reconciled work with study. Furthermore, by the Chi-Square Independence test, there was no significant association between occupation and gender (p-value > 0.05) (Table 7).

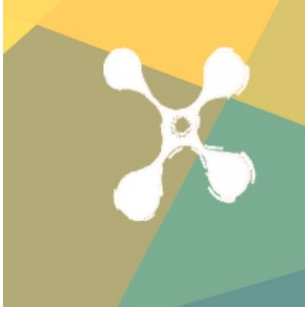
Table 7 - Algebraic association between occupation and gender

Factors		Gender		Total	p-value
		Male	Female		
Just studies	n (%)	70,0	30,0	100,0	
Studies and works at a time	n (%)	61,5	38,5	100,0	
Studies and works in the other two free times	n (%)	84,0	16,0	100,0	0,278
Total	n (%)	73,5	26,5	100,0	

Source: Prepared by the authors (2022).

3.3 Facing the problem of university evasion

In this perspective, this panorama needs the urgency of measures that mitigate the problem and the consequences already generated and expressed by the high rate of evasion. Considering that educational institutions had to adapt quickly to ensure the maintenance of education in a safe way, guidelines had to be discussed to guide work in this new period and new Pedagogical Plans had to be elaborated. This alternative offer of teaching ran into a series



International Journal of Knowledge Engineering and Management,
Florianópolis, v. 11, n. 30, p. 129 – 158, 2022.
• ISSN 2316-6517 •
• DOI: 1029327 •

of socioeconomic and institutional problems, especially in the public sector, which usually has a slower rate of change when compared to the private sector (Gusso, Archer, Luiz, Sahão, Luca, Henklain, Panosso, Kienen, Beltramello & Gonçalves, 2020).

The traditional form of teaching and the methodology applied in engineering contribute to the act of hierarchization of the student, which is something present not only in the ideal of the teaching-learning process of engineering, but also a proposal used by other courses. The teaching-learning process understood as a context (idea of total continuity and not something by parties or part of the process) constitutes a continuous and permanent action of observation and valorization of exams, of daily situations, articulated, gradual, progressive that will present beginning, middle and end. Thus, it is understood, according to Ferreira and Santos (2019), not as a linear and partial process, not always gradual, but a sequential act of acquisitions.

In the cases of technical training professors, coming from a bachelor's degree course, it is noticeable that most reproduce in their classroom the evaluative practices experienced throughout their schooling. Some professors perpetuate models based on demanding, rigid and authoritarian evaluation, focusing on seriousness to feed the myth of competence and that the quality of the courses falls when the majority of students are promoted, creating high rates of evasion and retention. However, other professors have a permissive attitude, not failing students by assigning maximum concepts, even ignoring those students who did not have tasks done or participated in the activities, the so-called *laissez-faire* throughout the teaching-learning context (Hoffmann, 2019).

In this bias, it is necessary to review how to interact with the student, so that they are active characters in the teaching-learning process, not a mere spectator, or receiver, and the professor is just the content issuer. For the next stage, we will seek successful experiences that have transformed, in an applicable way, the classroom to an environment of professor-student interaction that generates changes in the agents of the process. The first changes

International Journal of Knowledge Engineering and Management,
Florianópolis, v. 11, n. 30, p. 129 – 158, 2022.
• ISSN 2316-6517 •
• DOI: 1029327 •

should be based on the resignation of the function of each character involved, reviewing the fields of dominance and the possibility of giving prominence to students, not just when changing traditional evaluation practices. And that various methodological devices can be used, since the learning process occurs differently for each individual, allowing the act of learning to be effective (Hoffmann, 2019).

Moreover, as actions that are the responsibility of the Institution, that is, a prophylaxis in the fight against the endogenous causes of evasion could highlight greater attention in disciplines with a great history of disapproval, this with offers of monitoring for these disciplines; also, the creation of moments of help by the pedagogues of the Institution in order to help students in their schedules of extraclass studies, since they have just landed from high school in which there was probably no routine of extraclass studies present (Gómez-Bernárdez & Belmonte, 2020).

Also according to the authors, the creation of Permanence Grants could also assist, mainly, students who from the beginning have this tendency to start work activities to complement their families' needs. Moreover, extracurricular activities are shown to be promulgators of experiences and attractive to student's motivation, as in the case of scientific initiations, monitoring programs, development of extension projects.

Despite all the adaptations that the institutions made with the aim of maintaining the offer of education, there was an increase in psychological problems during the adaptation phases of remote classes. This led to decreased motivation, increased by the pressure to study independently and the interruption of the daily routine (Bäulke, Grunschel & Dresel, 2022). In this sense, the internal and external factors of the institution characterizes demotivation, which enables the high rates of evasion, since it is one of the determining factors in the decision to evade, generating academic, institutional and financial losses.

International Journal of Knowledge Engineering and Management,
Florianópolis, v. 11, n. 30, p. 129 – 158, 2022.
• ISSN 2316-6517 •
• DOI: 1029327 •

Regardless of the reason, the losses of students who start but do not finish their graduations are social, academic and economic wastes. In the case of public universities, the receipt of financial resources for their maintenance depends directly on the number of students enrolled. It is from this data that the amount that the government will allocate annually to the institution is calculated. This means that the smaller the number of enrollees, the smaller the resources received. Therefore, the higher the dropout rate, the lower the transfer of resources to maintain the same structure (Gusso et al., 2020). In this perspective, the results of this research bring to reflection the importance of knowing the individual characteristics of students who enter the HEI, and develop actions that meet the needs of specific groups. All this involves tread a new path, in which the contribution of higher education institutions permeates the careful look on students.

4. Conclusions

This study aimed to investigate the causes of dropout of students of the Bachelor of Civil Engineering course at IFPB - *campus* Patos during the period of remote classes caused by the CoronaVírus pandemic (2020-2021). By proposing the study of the bibliographic materials, due to issues of the very advancement of science, it was believed that the materials produced publicized already had diversified results, proposals already listed and investigated in relation to the act of contributing to the institutions in the process of eradication of evasion. However, what was noticed was that in most published academic papers, there is a constant induction to investigate the causes that cause these newly entering engineering and even the students already stabilized to evade the courses.

Moreover, it was evident that evasion is indicative of failures in the teaching-learning process, as well as of taking action in relation to its full combat. In this perspective, university

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• ISSN 2316-6517 •
• DOI: 1029327 •

evasion is the direct consequence of endogenous and exogenous issues in face of the challenges faced by the student.

As for coping with and mitigating the problem, initiatives would be linked to the strengthening of the process of student permanence in universities. Institutions could encourage student permanence by providing a greater amount of aid, scholarships and financial support for the development of scientific initiations and work, as well as extension activities, in order to engage the academic community in extracurricular activities. In addition, institutions can analyze their curriculum, seeking an update, providing the initial contact of the engineering areas in order not to distance the professional area of the student. From this perspective, basic education has an important role in this process and it is up to high schools to promote lectures, short courses, trade fairs in partnership with the HEI, in order to present and promote direct contact of the profession with future professionals, assisting students in their academic and vocational choice.

Finally, notes for new research may be linked in both profiling the evaded students, as well as in future interventions in institutions, such as more assertive reduction plans in the fight against evasion and the promotion of a fairer and more egalitarian engineering teaching for all. With the referrals for completion of the research, we will have material and experience of the team to produce a scientific material that can assist the IFPB - *campus* Patos in taking measures that mitigate the problem of evasion and consequences generated in the pandemic context.

International Journal of Knowledge Engineering and Management,
Florianópolis, v. 11, n. 30, p. 129 – 158, 2022.
• ISSN 2316-6517 •
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References

Bardach, L., Lüftenegger, M., Lüftenegger, S., Spiel, C., & Schober, B. (2020). Context-related problems and university students' dropout intentions - the buffering effect of personal best goals. *European Journal of Psychology of Education*, 35, 477-493.

Bäulke, L., Grunschel, C., & Dresel, M. (2022). Student dropout at university: a phase-orientated view on quitting studies and changing majors. *European Journal of Psychology of Education*, 37 (1), 853-876.

Behr, A., Giese, M., Kamdjou, H. D. T., & Theune, K. (2021). Motives for dropping out from higher education - An analysis of bachelor's degree students in Germany. *Eur J Educ.*, 56, 325-343.

Brasil. (2017). Ministério da Educação. *Metodologia de Cálculo de Indicadores de Fluxo de Ensino Superior*. Brasília, 2017. https://download.inep.gov.br/informacoes_estatisticas/indicadores_educacionais/2017/metodologia_indicadores_trajetoria_curso.pdf. Recuperado em 18 fevereiro de 2022.

Bussab, W. O., & Morettin, P. A. (2006). *Basic Statistics*. São Paulo: Saraiva.

Cunha, C. R., Vidal, L. A., Tiegs, H. S., & Tiegs, M. (2021). The Profile of Engineering Public Higher Education Students and their Potentialities for Evasion. *Journal of Teaching, Education and Human Sciences*, 22 (4), 493-498.

Ferreira, M. S., & Santos, A. V. (2019). *Escalímetro: uma sequência didática para o ensino de desenho técnico arquitetônico*. Curitiba: Appris.

Freitas, B. A., Costa, E. C. A. C., & Costa, C. P. (2017). Fatores de Evasão dos Alunos no Curso de Engenharia Civil da Universidade Estadual da Paraíba. *Revista Principia*, 1 (34), 69-76.

International Journal of Knowledge Engineering and Management,
Florianópolis, v. 11, n. 30, p. 129 – 158, 2022.
• ISSN 2316-6517 •
• DOI: 1029327 •

García-Alberti, M., Suárez, F., Chiyón, I., & Feijoo, J. C. M. (2021). Challenges and Experiences of Online Evaluation in Courses of Civil Engineering during the Lockdown Learning Due to the COVID-19 Pandemic. *Education Science*, 11 (2), 1-19.

Gil, A. C. (2017). *How to design research projects* (6ª ed.), São Paulo: Atlas.

Gómez-Bernárdez, A., & Belmonte, M. L. (2020). School dropout, determinants, educational policies and subsequent itineraries**.** *Research, Society and Development*, 9 (10), 1-15.

Gottlieb, M., Utesch, M. C., & Bohm, M. (2019). Beyond 2030 Challenges of Engineering Education in an Information Systems Driven World – an Extraction based on Research Topics, *2019 IEEE Global Engineering Education Conference (EDUCON)*, 2019, 458-466.

Gusso, H. L., Archer, A. B., Luiz, F. B., Sahão, F. T., Luca, G. G., Henklain, M. H. O., Panosso, M. G., Kienen, N., Beltramello, O., & Gonçalves, V. M. (2020). Higher education in times of pandemic: guidelines for university management. *Education & Society*, 41 (1), 1-27.

Hoffmann, J. (2019). *Mediating evaluation: a practice under construction from preschool to university*. Porto Alegre: Mediação.

Lamers, J. M. S., Santos, B. S., & Toassi, R. F. C. (2017). Retention and leakage in public higher education: case study in na Evening dentistry course. *Education in magazine*, 1 (33), 1-26.

Larsen, M. R., Sommersel, H. B., & Larsen, M. S. (2013). *Evidence on Dropout Phenomena at Universities*. Danish clearinghouse for educational research. AARHUS, Copenhagen. http://edu.au.dk/en/research/research-areas/danishclearinghouse-for-educational-research/. Recuperado em 20 janeiro de 2023.

International Journal of Knowledge Engineering and Management,
Florianópolis, v. 11, n. 30, p. 129 – 158, 2022.
• ISSN 2316-6517 •
• DOI: 1029327 •

Mireles-Rios, R., Rios, V. M., & Reyes, A. (2020). Pushed Out for Missing School: The Role of Social Disparities and School Truancy in Dropping Out. *Education Sciences*, 10 (4), 1-15.

Nunes, A. A., Martins, P. D., & Souza, J. P. M. (2022). Ensino remoto emergencial de projeto arquitetônico: desafios, análise e proposta. *Revista Educação Gráfica*, 26 (1), 135-154.

Olmedo-Cifuentes, I., & Martínez-León, I. M. (2022). University dropout intention: Analysis during COVID-19. *Journal of Management and Business Education*, 5 (2), 97-117.

Quispe-Prieto, S., Cavalcanti-Bandos, M. F., Caipa-Ramos, M., Paucar-Caceres, A., & Rojas-Jiménez H. H. (2021). A Systemic Framework to Evaluate Student Satisfaction in Latin American Universities under the COVID-19 Pandemic. *Systems*, 9 (1), 1-21.

Ramberg, J., Laftman, S. B., Frasson, E., & Modin, B. (2019). School effectiveness and truancy: a multilevel study of upper secondary schools in Stockholm. *International Journal of Adolescence and Youth*, 24 (2), 185–198.

Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M. (2020). Online University Teaching During and After the Covid-19 Crisis: Refocusing Teacher Presence and Learning Activity. *Postdigital Science and Education*, 2 (1), 923–945.

Respondek, L., Seufert, T., Stupnisky, R., & Nett, U. E. (2017). Perceived academic control and academic emoticons predict undergraduate university student success: Examining effects on dropout intention and achievement. *Frontiers in Psychology*, 8 (1), 1-18.

Silva, J. B., & Silva, J. G. (2019). Evasion of Industrial Engineering students of FT/UFAM. *International Journal for Innovation Education and Research*, 7 (10), 551-564.

International Journal of Knowledge Engineering and Management,
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