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Association Between Student's Profile and Academic Achievement in an e-learning Primary Health Care Specialization Course

Associação entre o Perfil do Estudante e o Desempenho Acadêmico em um Curso de Especialização em Atenção Primária a Saúde EaD

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Abstract. The aim of the present study was to analyze the relationship between the student's profile and academic achievement, using data of the Family Health Specialization course at the UNA-SUS/UFCSPA (FHS). A total of 4,438 students enrolled in the course until 2018, and all that completed the activities (n = 4219) were considered in the analysis. The characterization of academic performance, the student' status at the end of the course were considered, and the students were classified as: approved, reproved, evaded or unsubscribed; also the student's final grade was considered to characterize their academic achievement. A descriptive analysis and logistic regression models were constructed to verify an association between the student profiles and academic achievements. Most students were female (63.7%), Brazilian (63.9%), unmarried (66.9%), part of the Mais Médicos Program (54.5%), have less than one year formed (32.0%), had never performed

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distance education activities (72.5%), had internet access at home (94.9%) and at work (64.5%), and used the computer at least six days a week (53.4%). Among the students, 2,643 (52.6%) approved and 1,576 (47,4%) reproved or did not finish the cours. Gender, course entry form, undergraduate course, age at the beginning of the course and region of professional activity were associated with the achievement in the course and grade in complex cases essay.

Keywords: Academic achievement. Distance learning. e-larning. Primary health care.

Resumo. *O objetivo do presente trabalho foi estudar a relação entre as características do aluno do curso de Especialização em Saúde da Família da UNA-SUS/UFCSPA (EspSF) e o desempenho acadêmico. O estudo tem caráter observacional transversal analítico. As análises foram realizadas a partir de dados do curso de EspSF, que é ofertado na modalidade a distância, para médicos, dentistas e enfermeiros. Um total de 4438 alunos realizaram matrícula no curso até 2018, sendo considerados nas análises todos os concluintes até 2018 (n=4219). Para caracterização do desempenho acadêmico no curso foram considerados o estado do aluno ao final do curso, sendo os alunos classificados em: aprovado, reprovado, evadido ou desligado; e a nota final do aluno na atividade de casos complexos. Após uma análise descritiva foram construídos modelos de regressão logística para verificar a associação entre as características dos alunos e o desempenho no curso. A maior parte dos alunos é do gênero feminino (63,7%), brasileiro (63,9%), não é casado (66,9%), faz parte do Programa Mais Médicos (54,5%), formado há menos de um ano (32,0%), nunca havia realizado atividades de educação a distância (72,5%), tem acesso à internet em casa (94,9%) e no trabalho (64,5%), e usa o computador ao menos seis dias da semana (53,4%). Dentre os alunos há 2643 (52,6%) aprovados e 1576 (47,4%) reprovaram ou não concluíram o curso. Gênero, forma de entrada no curso, curso de graduação, idade no início do curso e a região de atuação profissional estão associados ao aproveitamento no curso e nota na avaliação de casos complexos.*

Palavras-chave: *Desempenho acadêmico. Educação a distância. Ensino online. Atenção primária à saúde.*

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1. Introduction

In the last decades, new demands in terms of health organization have emerged in Brazil. Work perspectives have been defined that aim to promote health and self-care which require qualified professionals. Based on this new premise, policies were developed to induce actions that aimed at strengthening the work in Primary Care, in which one of the needs set is the permanent education of professionals working in the SUS (CORTEZ *et al.*, 2019; SANTOS *et al.*, 2017; GONÇALVES *et al.*, 2019). It is in this context that the

Open University of SUS (UNA-SUS) was created by the Ministry of Health in 2008. It is a system that meets needs related to the permanent education of Brazilian professionals. It is estimated that less than 2% of the total number of Brazilian doctors has specialization to act as a family and community doctor (AUGUSTO *et al.*, 2018). Considering the country's territorial greatness and the unequal distribution of doctors in the most distant regions of large urban centers, where the doctor-inhabitant ratio was low, the option of taking courses in distance education is made, ensuring that these have a practical and dynamic focus. In this context, the Program to Value Primary Healthcare Professionals (PROVAB) and Mais Médicos (More Doctors) Program is instituted, which has among its objectives "to reduce the shortage of doctors in the priority regions for the SUS in order to reduce regional inequalities in the area of health. In the redistribution of doctors by the Mais Médicos Program, permanent education of professionals is foreseen through the UNA-SUS Network, which supports the Mais Médicos Program, promoting the Specialization Course in Family Health (DAHMER *et al*., 2017; OLIVEIRA *et al*., 2015).

The FHS course aims to: "Enable doctors, nurses and dentists to reframe and qualify services of their practices in Basic Units, in the Family Health Strategy, based on the problematization of daily actions at work with primary care health, contributing to the reduction of inequalities between different regions of the country." According to Brazilian educational legislation, the course features distance and face-to-face assessments carried out during the 12-month period. During the course, there are 390 hours of study for doctors and nurses, and 590 hours for dentists. During the activities, students receive support from tutors and the pedagogical team, aiming at optimizing the learning process. For approval, the student must obtain a final grade of 6.0. At the end of the course, the student could be classified as failing when he did not reach the minimum grade in the assessments or did not attend the face-to-face assessments; dropouts were those students without frequency in the virtual learning environment; and the disconnected are those who have requested to close their registration.

In the case of a distance course, aimed at professionals who already work in the services, and to meet a specific demand of a large number of students, who have different characteristics and experience different situations in their daily work, it is essential that get to know the target audience and the relationships between the different characteristics of the students and the evolution of the teaching-learning process. In this field, understanding how these relationships occur can guide professionals in the pedagogical field in building strategies to work with these students in a more effective way. Thus, the aim of the present study was to study the association between student characteristics of the Specialization Course in Family Health at the UNA-SUS / UFCSPA and academic performance. In addition, a study with a large database, such as the one used in the present study, which has more than 3000 students, can bring more robust analyzes that contribute to the organization of distance courses.

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2. Methods

The analyses were carried out using data from the students of the Specialization course in Family Health at UNA-SUS / UFCSPA, which is offered in the distance mode.

Building the database

Information regarding student characteristics was provided by the course secretary. Since the beginning of activities, the UNA-SUS / UFCSPA has had 18 classes in the FHS course. At the beginning of each class, demographic, socioeconomic and use of information and communication technologies were collected. Students' grades in all activities during the course and the student's outcome at the end of the course were also obtained. A total of 4438 students were enrolled in the course until 2018, when the data was provided by the UNA-SUS / UFCSPA secretariat.

The variables (independent / predictive) included in the database were: gender, age, nationality, marital status, undergraduate course, time since graduation at the beginning of the course, previous experiences in distance courses, forms of internet access, frequency of computer use, form of entry to the course. Those students who took the course more than once, not succeeding on the first attempt, had their performance analyzed only on the last attempt, and the multiple attempts constituted yet another predictive variable to be included in the analytical models.

The outcome variables (dependent), which characterized the academic performance in the course, included were: student status at the end of the course (approved / failed / dropped / disconnected); and the student's note of the activity of "complex cases", an evaluative activity of the course, which simulates the daily lives of these professionals, enabling the establishment of relationships with their experiences to provide reflections and advances in improving actions and care.

Data analysis and construction of logistic regression models

After an initial descriptive analysis, the influence of the students' characteristics on the academic outcome was assessed using logistic regression models, in which the student's status at the end of the course and the grade in complex cases were considered as the outcome. For the analysis, the student's status at the end of the course was categorized dichotomously as "success" and "failure". All those who, at the end of the course, successfully completed all tasks, fulfilled all the requirements for obtaining the title of Specialist in Family Health were categorized as “successful”; all other students were classified as “unsuccessful.” The final score in the activities of complex cases was categorized as “excellent” and “regular”, considering those students with a score up to 8.0 as regular and those with a score above 8.0 in excellent; this parameter was established because it constitutes the borderline value for the percentage of 25% of students with higher grades. The odds ratios for the outcomes to be studied were calculated.

For the construction of the adjusted logistic regression models, the variables that showed an association ($p<0.05$) with the outcome variable in the bivariate analyzes were maintained. In the first adjusted model, all variables associated with the outcome were

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included, and in the second, variables related to the profile of internet use and previous experience in distance learning activities were excluded. The analyses were performed using the PASW Statistics 18 software (IBM, USA), considering a significance level of 5%.

3. Results

Table 1 shows a characterization of the UNA-SUS / UFCSPA students who took the Specialization Course in Family Health from 2011 to 2018, showing the distribution regarding their outcome in the course. Data of 4219 students were analyzed. Most students are female (63.7%), Brazilian (63.9%), are not married (66.9%), are part of the Mais Médicos Program (54.5%), are doctors (75.4%), graduated less than a year ago (32.0%), had never carried out distance learning activities (72.5%), has access to the internet at home (94.9%) and at work (64, 5%) and uses the computer at least six days a week (53.4%). Among foreign students there were: 1431 Cubans (32.2%), 27 Venezuelans (0.6%), 20 Argentines (0.5%), 17 Uruguayans (0.4%), 15 Peruvians (0.3%). There are also students from 17 other countries. Among the students, 2643 (52.6%) were approved, 1142 (27.1%) failed, 308 (7.3%) dropped out and 126 (3.0%) were dismissed for administrative reasons (most of them request shutdown or were not anymore eligible to participate on PROVAB or Mais Médicos Program).

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Table 1. Characteristics of students enrolled in the Family Health Specialization course at the UNA-SUS / UFCSPA, total and divided into subgroups according to their progress in the course.

Variables	*General*	*Success*	*Failure*
Gender			
Masculine	1609 (36.3%)	843 (31.9%)	678 (43.0%)
Feminine	2829 (63.7%)	1800 (68.1%)	898 (57.0%)
Nationality			
Brazilian	2746 (63.9%)	1766 (68.2%)	889 (58.9%)
Foreigner	1549 (36.1%)	823 (31.8%)	621 (41.1%)
Marital status			
Single/Separated/Divorced/Widow	1125 (66.9%)	669 (67.0%)	354 (66.7%)
Married	557 (33.1%)	330 (33.0%)	177 (33.3%
Course entry form			
FHS	1014 (22.8%)	690 (26.1%)	324 (20.6%)
PROVAB	1004 (22.6)	735 (27.8%)	269 (17.1%)
Mais Médicos	2420 (54.5%)	1218 (46.1%)	983 (62.4%)
Previously enrolled in the course			
No	4259 (96.0%)	2579 (97.4%)	1466 (93.0%)
Yes	179 (4.0%)	69 (2.6%)	110 (7.0%)
Undergraduate course			
Medicine	3348 (75.4%)	1925 (72.8%)	1204 (76.4%)
Nursing	794 (17.9%)	524 (19.8%)	270 (17.1%)
Dentistry	296 (6.7%)	194 (7.4%)	102 (6.5%)
Age at start of course			
20 to 25 years old	312 (15.2%)	239 (18.2%)	73 (9.9%)
26 to 30 years old	681 (33.2%)	458 (34.9%)	222 (30.2%)
31 to 40 years old	630 (30.7%)	382 (29.1%)	247 (33.7%)
41 years old or older	426 (20.9%)	233 (17.8%)	192 (26.2%)

Time formed start of course			
Up to 1 year	1032 (32.0%)	643 (32.1%)	341 (33.4%)
2 to 5 years	748 (23.3%)	450 (22.5%)	247 (24.2%)
6 to 10 years	575 (17.9%)	388 (19.4%)	146 (14.3%)
11 to 20 years	494 (15.4%)	303 (15.2%)	165 (16.2%)
More than 20 years	367 (11.4%)	215 (10.8%)	122 (11.9%)
Region of Brazil where operates			
South	2299 (52.1%)	1461 (55.3%)	661 (42.6%)
North east	424 (9.6%)	294 (11.1%)	127 (8.2%)
North	1689 (38.3%)	885 (33.5%)	765 (49.3%)
Previous experience in e-learning activities			
Yes	560 (27.5%)	336 (26.9%)	185 (29.6%)
No	1478 (72.5%)	915 (73.1%)	441 (70.4%)
Has internet access at work			
Yes	1319 (64.5%)	819 (65.3%)	380 (60.3%)
No	727 (35.5%)	436 (34.7%)	250 (39.7%)
Has internet access at residence			
Yes	1939 (94.9%)	1194 (95.2%)	591 (93.8%)
No	105 (5.1%)	60 (4.8%)	39 (6.2%)
Weekly frequency of computer use			
6 to 7	992 (53.4%)	685 (55.4%)	303 (49.9%)
3 to 5	598 (32.2%)	389 (31.5%)	201 (33.1)
0 to 2	266 (14.4%)	162 (13.1%)	103 (17.0%)

FHS: Professionals working in the Family Health Strategy

The regression analyzes, considering the outcomes of use in the course and performance of the activity of complex cases, are presented in Tables 2 and 3, respectively. For each outcome, two analytical models were developed, one including all variables associated with the outcome in the univariate analysis (Model 1), and the other removing the variables related to the Internet usage profile (Model 2). The exception was gender, which was arbitrarily maintained in all models, regardless of having a univariate association. Marital status, having previous experience in distance learning activities, having internet at home did not show any association with success in the course. As for the score in complex cases, marital status, having previously enrolled in the course, and having internet at home, they were not associated with the outcome in question.

When adjusting the variables in the models, some characteristics were shown not to be associated with both the use of the course and the grade in complex cases, such as nationality, having previously enrolled in the course, time since graduation, having previous experience in distance learning activities and weekly frequency of computer use. Gender, form of entry into the course, undergraduate course, age at the beginning of the course and the region of professional activity are associated with success in the course and the grade in complex cases. In general, these associations were shown to be stronger in the adjusted model 2, which has a larger number of observations. The greater number of observations in this model occurs due to the non-inclusion of variables related to the profile of internet use, which had some missing data.

Women have 40% chances (OR: 0.60; 95% CI 0.48-0.75) and 36% (OR: 0.74; 95% CI: 0.56-0.97) lower than those men, failing the course or lower grades, respectively. Age at the beginning of the course was also associated with academic performance, so that the

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older the student, the greater the chances of failure in the course and lower grades. Students over 40 are twice as likely to fail (OR: 2.31; 95% CI: 1.41-3.78) and lower grades (OR: 2.18; 95% CI: 1.20 -3.98) when compared to students under 25 years old. The region of origin of the students also has an influence on the evaluated outcomes when comparing students from the North of the country with those from the South, we see that the former are more likely to fail and have worse grades.

The evaluation of the undergraduate course showed that nurses and dentists are more likely to have worse academic performance than doctors. Nurses have 53% (OR: 1.53; 95% CI: 1.12-2.08) more chance of failure when compared to doctors. Dentists have 77% (OR: 1.77; 95% CI: 1.13-2.77) more chance of worse performance in complex cases when compared to doctors. The way of entering the course, although associated with achievement and grade in complex cases, showed a different association pattern. While Mais Médicos professionals had up to three times more chance of failure (OR: 3.07; 95% CI: 1.65-5.72) when compared to the DEA professionals, the same professionals had approximately half the chance (OR: 0.45; 95% CI: 0.20-0.98) of having a lower score in complex cases.

Internet access in the workplace showed no association with achievement in the course, however, those students who did not have access to the network at their workplace had almost half the chance (OR: 0.54; 95% CI: 0.36-0.81) to score lower in complex cases than those with access to the network.

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Table 2. Association between failure in the Family Health Specialization course and student characteristics.

Variables	*Not adjusted*			*Adjusted model 1 (n=1238)*			*Adjusted n (n=14*	
	OR	*CI 95%*	*p*	*OR*	*CI 95%*	*p*	*OR*	*CI 95*
Gender			0.000			0.001		
Masculine	1			1			1	
Feminine	0.62	(055-0.71)		0.58	(0.43-0.79)		0.60	(0.48-0.
Nationality			0.000			0.664		
Brazilian	1			1			1	
Foreigner	1,50	(1.31-1.71)		1.39	(0.31-6.16)		0.65	(0.36-1.
Marital status			0.905					
Single/Separated/Divorced/Widow	1							
Married	1.01	(0.81-1.27)						
Course entry form			0.000			0.210		
FHS	1			1			1	
PROVAB	0.78	(0.64-0.95)		0.71	(0.41-1.21)		0.80	(0.54-1.
Mais Médicos	1.72	(1.47-2.01)		-	-		3.07	(1.65-5.
Previously enrolled in the course			0,000			0,060		
No	1			1			1	
Yes	2.80	(2.06-3.81)		0.14	(0.02-1.09)		0.52	(0.23-1.
Undergraduate course			0,038			0,384		
Medicine	1			1			1	
Nursing	0,82	(0.70-0.97)		1.24	(0.85-1.80)		1.53	(1.12-2.
Dentistry	0.84	(0.65-1.08)		1.00	(0.65-1.54)		1.38	(0.96-1.
Age at start of course			0.000			0.051		
20 to 25 years old	1			1			1	

26 to 30 years old	1.59	(1.17-2.16)		1.33	(0.87-2.04)		1.59	(1.13-2.
31 to 40 years old	2.12	(1.56-2.88)		1.88	(1.16-3.03)		2.23	(1.51-3.
41 years old or more	2.70	(1.95-3.73)		1.96	(1.06-3.62)		2.31	(1.41-3.
Time formed start of course			0.015			0.624		
Up to 1 year	1			1			1	
2 to 5 years	1.04	(0.85-1.27)		0.96	(0.64-1.45)		1.37	(0.98-1.
6 to 10 years	0.71	(0.56-0.89)		0.75	(0.45-1.25)		0.96	(0.63-1.
11 to 20 years	1.027	(0.82-1.29)		0.71	(0.39-1.29)		0.93	(0.58-1.
More than 20 years	1.07	(0.83-1.39)		0.70	(0.32-1.56)		0.95	(0.53-1.
Region of Brazil where operates			0.000			0.000		
South	1			1			1	
North east	0.96	(0.76-1.20)		1.30	(0.66-2.55)		0.99	(0.67-1.
North	1.91	(1.67-2.18)		3.35	(1.88-5.99)		2.84	(2.06-3.
Previous experience in e-learning activities			0.219					
Yes	1							
No	0.88	(0.71-1.08)						
Has internet access at work			0.036			0.231		
Yes	1			1				
No	1.24	(1.01-1.51)		0.83	(0.60-1.13)			
Has internet access at residence			0,198					
Yes	1							
No	1.31	(0.87-1.99)						
Weekly frequency of computer use			0.033			0.734		
6 to 7	1			1				
3 to 5	1.17	(0.94-1.45)		1.00	(0.75-1.33)			
0 to 2	1.44	(1.09-1.91)		1.17	(0.78-1.77)			

FHS: Professionals working in the Family Health Strategy; OR: odds ratio; CI: confidence interval.

Table 3. Association between worse performance in the activities of complex cases in the Specialization course in Family Health and the characteristics of students.

Variables	***Not adjusted***			***Adjusted model 1 (n=812)***			***Adjuste (n=1***	
	OR	***CI 95%***	***p***	***OR***	***CI 95%***	***p***	***OR***	***CI 9***
Gender			0.448			0.111		
Masculine	1			1			1	
Feminine	0.94	(0.80-1.10)		0.74	(0.51-1.07)		0.74	(0.56-
Nationality			0,000			0.821		
Brazilian	1			1			1	
Foreigner	0.63	(0.54-0.74)		1.22	(0.22-6.62)		0.91	(0.43-
Marital status			0.549					
Single/Separated/Divorced/Widow	1							
Married	0.93	(0.72-1.19)						
Course entry form			0.000			0.007		
FHS	1			1			1	
PROVAB	0.23	(0.18-0.29)		0.35	(0.16-0.75)		0.39	(0.23-
Mais Médicos	0.34	(0.28-0.41)		-			0.45	(0.20-
Previously enrolled in the course			0.855					
No	1							
Yes	1.04	(0.69-1.56)						
Undergraduate course			0.000			0.666		
Medicine	1			1			1	
Nursing	2.86	(2.34-3.51)		0.88	(0.53-1.47)		1.45	(0.98-

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Dentistry	3.42	(2.51-4.66)		1.01	(0.61-1.85)	1.77	(1.13-
Age at start of course			0.008			0.021	
20 to 25 Years old	1			1		1	
26 to 30 years old	1.31	(0.92-1.87)		1.07	(0.63-1.81)	1.16	(0.78-
31 to 40 years old	1.77	(1.24-2.53)		1.63	(0.90-2.95)	1.65	(1.04-
41 years old or more	1.61	(1.10-2.33)		2.70	(1.27-5.76)	2.18	(1.20-
Time formed start of course			0.000			0.117	
Up to 1 year	1			1		1	
2 to 5 years	1.49	(1.17-1.90)		1.14	(0.64-2.04)	1.12	(0.72-
6 to 10 years	1.02	(0.78-1.33)		1.06	(0.53-2.12)	0.86	(0.50-
11 to 20 years	0.82	(0.61-1.09)		0.67	(0.30-1.48)	0.56	(0.30-
More than 20 years	0.75	(0.54-1.04)		0.38	(0.14-1.05)	0.58	(0.28-
Region of Brazil where operates			0.000			0.016	
South	1			1		1	
Northeast	0.45	(0.33-0,62)		0.63	(0.24-1.61)	0.69	(0.41-
North	0.86	(0.74-1.02)		2.25	(1.02-4.96)	1.40	(0.94-
Previous experience in e-learning activities			0.025			0.473	
Yes	1			1			
No	0.76	(0.59-0.97)		1.13	(0.81-1.57)		
Has internet access at work			0.000			0.003	
Yes	1			1			
No	0.53	(0.41-0.67)		0.54	(0.36-0.81)		
Has internet access at residence			0.269				
Yes	1						
No	0.75	(0.45-1.25)					
Weekly frequency of computer use			0.015			0.680	
6 to 7	1			1			
3 to 5	0.75	(0.58-0.98)		0.88	(0.62-1.25)		
0 to 2	0.64	(0.45-0.91)		0.84	(0.49-1.43)		

FHS: Professionals working in the Family Health Strategy; OR: odds ratio; CI: confidence interval.

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4. Discussion

The quality of teaching in distance learning or e-learning has been discussed and most of the time a parallel of its effectiveness is traced in comparison with classroom teaching. However, this discussion seems to have been overcome, given that the literature supports the quality of distance education (LIU *et al.*, 2016; SOUZA *et al.*, 2018), as well as other tools of information and communication technology (REIS *et al.*, 2015; TUBELO *et al.*, 2019); and that, for the most part sometimes it is not a question of comparing the educational resources used in the teaching-learning process, but of evaluating the context for which they were proposed. And in this context, perhaps, there is one of the greatest limitations of distance education, which is the interaction between the educator and the student. In distance education, we do not have the figure of the teacher, but of the content writer, and in certain situations of a tutor. They interact with students through the tools of information and communication technology, which, even today, can make it difficult for students who face learning difficulties during activities to be identified and receive due attention, with a view to a satisfactory performance in the course. The study of the association between student characteristics of the Family Health Specialization course at

the UNA-SUS / UFCSPA carried out in the present study, identified, in the quite heterogeneous group of students, characteristics that were associated with an unsatisfactory academic performance. Male students, nurses or dentists, aged over 25 years, and working in the Northern region of Brazil were characteristics associated with a worse academic performance.

A delicate issue when studying distance learning courses is evasion, which routinely presents expressive numbers (NISTOR *et al*., 2010; ABED 2016). Students at FHS at UNA-SUS / UFCSPA could present three records that characterized failure in the course: failure (27.1%), abandonment / evasion (7.3%) or administrative dismissal (3.0%). In the FHS course at the UNA-SUS / UFCSPA, those students who did not attend EDA activities were classified as dropouts; to be classified as failing, students should have an unsatisfactory overall grade of the course or else not attend the face-to-face assessments. However, the classification as failing or dropping out is not always defined in the same way in the different courses, and so it was decided to categorize the outcome in a dichotomous way for the analysis of the present work. Observing the failed and evaded portion together, we have 34.4% of the students, this value being close to those described by the Brazilian Association of Distance Education for distance learning courses (ABED 2016).

In the present work, academic performance was evaluated in two ways, one regarding the approval in the course and the other regarding the grade in an activity that simulated the daily activities of the family and community professional (activity of complex cases). In general, the characteristics related to failure in the course were also associated with lower grades in the activity of complex cases. The exception is made for the entry program in the course, when those professionals who entered via Mais Médicos showed three times more chance of failure in the course compared to those entering via the FHS, but were 55% more likely to have a higher grade in the case activity compared to those entering the FHS. Possibly this opposition is a reflection of the failure to carry out evaluative activities, resulting in lower grades, and not of learning difficulties. In other words, those students at Mais Médicos, when they proposed to carry out the activities, did it with quality.

When analyzing the use of the course according to the type of admission, we have a different panorama among those entering via the FHS, PROVAB and Mais Médicos. Those entering via the FHS and PROVAB have approval rates of 68.0% and 73.2%, respectively, while those entering via Mais Médicos have 55.3% approval. In the composition of the failures, there is a balance as to the dropout percentage, 14.9% and 10.9%, and failure rate 13.2% and 15.0%, in the FHS and PROVAB students, respectively. This balance does not occur in the students of Mais Médicos, where there is 2.2% dropout and 38.9% failure. These differences are possibly due to the students' motivation to take the course, since taking it was a mandatory condition for remaining as a professional in the Mais Médicos program, and in this group of students there was an important portion of foreign professionals.

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When performing multivariate analyzes, the gender of the students showed an association with the performance in the course, as much as the achievement, as the grade. Women have a chance of up to 40% and up to 36% less than men, of failing the course or lower grades, respectively. From the pedagogical point of view, at the individual level, this difference has no implications for the teaching-learning process, since during the construction of learning, the promoters of the action, be they teachers, tutors or content teachers, will not modify the lesson plans according to the gender of the students. However, in the case of distance learning courses offered to a large number of students, establishing some type of specific supervision for male students can be a strategy to prevent their failure. This supervision strategy can be, simply, a greater frequency of contacts between the academic support team and the student, stimulating the performance of activities, for example. The students' marital status, unlike other studies (RODRIGUES *et al.*, 2016; PAULA *et al.*, 2017), showed no association with performance in the course. Likewise, the fact that the student is taking the course in a second attempt, which means that he was not approved the first time he was enrolled, was not associated with his academic performance.

Paying attention to the positioning of the results of the present study in the existing literature, it is observed that similar assessments were carried out in courses offered in the face-to-face modality. An evaluation carried out with higher education students in the area of Social Sciences evaluated the joint influence of gender, age, marital status, work activities and admission to higher education, and showed that being a man increases the chance of failure by five times for academic activities, and that marital status has no influence on academic performance (DA SILVA 2013). These data are corroborated in part by another study, which evaluated the influence of the profile of undergraduate students in Accounting, through univariate analyzes, and found that men have worse performance, however, found no difference in terms of age or marital status (CAVICHIOLI *et al.*, 2016). A multivariate analysis, with a sample of undergraduate students in Accounting, showed that the gender of students does not influence their academic performance, but that older students over 25 years old and singles are worse off (PAULA *et al.*, 2017). One of the few studies evaluating academic performance in distance learning courses also works with undergraduate students in Accounting. In that study, using a multivariate model, it was found that women and singles have worse academic performance, and that age does not influence performance (RODRIGUES *et al.*, 2016). International literature also provides assessments of the influence of student characteristics. An evaluation with business relations students at a Chinese university showed, in univariate analyzes, that the female gender was associated with better academic performance compared to the male gender. In that study, age and marital status were not related to academic performance (CAVICHIOLI *et al.*, 2016).

Differences between the male and female genders in academic performance may be related to self-efficacy, which concerns the individual's emotional assessment of his or her own abilities to accomplish something. Those with greater self-efficacy tend to be more motivated to perform tasks, and it is known that gender can be associated with it

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(HUANG, 2012; YOKOYAMA, 2018). Self-efficacy can be modulated by other factors, even physiological, such as perceptions of fatigue, pain and fear (YOKOYAMA, 2018). The way in which students "interact" with technologies can also be related to this difference. Women understand better the importance of planning studies and making contact with the tutor when necessary (GONZÁLEZ-GÓMEZ *et al*., 2012).

The students' nationality was not associated with academic performance. Although foreign students could have language limitations, since most of them had Spanish as their mother tongue, and a greater tendency to be unfamiliar with the country's public health policies, there was no greater incidence of failure or low grades of these students compared to Brazilians.

The UNA-SUS / UFCSPA FHS Course was designed to train professionals capable of working in the field of primary health care, within the Family Health Strategies, and included the training of doctors, nurses and dentists. It was observed that doctors had a better academic performance compared to nurses and dentists. These associations, although statistically significant, may have no practical implications. Medicine, Nursing and Dentistry are undergraduate courses that follow Brazilian curricular guidelines that aim to train general practitioners and prepared for primary health care practices. One possible explanation could be the longer course time required of dentists. Unlike the student's undergraduate course, the time since graduation at the beginning of the course was not associated with academic performance. Professionals who have graduated for a longer period of time probably have worked less on their undergraduate qualifications to work with primary health care and family health strategy guidelines, which received emphasis from the latest national curriculum guidelines. On the other hand, their experience at work may have stimulated them to seek the knowledge and work on the attitudes that the most recently graduated worked on during their graduation period.

The region in which the student worked was found to influence performance in the course. Among the Brazilian South, Northeast and North regions, students from the North had a higher chance of failure and lower grades when compared to students from other regions. Possibly, these differences are not due to the specific characteristics of the students, but rather to specificities of the region, such as workload with patients, or, more likely, connectivity to the internet at the site. In a 2014 report by the Internet Steering Committee in Brazil, it was pointed out that the North region of the country has the lowest proportion of households with internet (35%), a lower proportion of providers per inhabitant than the South and Southeast, in addition to having a lower offer of connections with higher speeds (above 1Mbps) (ALEXANDRE, 2016). These limitations in connectivity, combined with the great territorial extension of the region, can make it difficult to carry out distance learning tasks. In addition, these students may face greater difficulty in moving to the centers where the face-to-face assessments are carried out.

The age of the students influenced the performance in the course, and as the age increased, the chances of failure and lower grades became higher. Considering the condition of the student at the end of the course, students aged 26 to 30 were about 50% more likely, and students aged 31 or over were about 200% more likely to fail in the course when compared

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to students who they were up to 25 years old at the beginning of the course. These differences are probably explained by the fact that we have digital natives and digital immigrants in the sample. In this context, some students, in addition to developing the skills of a family health specialist, have to go through a learning curve regarding the information and communication technologies used in activities. In the course there are students from different technological generations, X and Y, in which the latter was born in the digital age, amid the technological flow of information. In Generation X students, those over 30, the measures of effect calculated in the logistic regression models become significant, indicating a greater risk of worse academic performance (LARSON 2003; STEVENS *et al.*, 2012; COFFERRI *et al.*, 2017). The mapping of these generations within a large group of students can support the actions of the managers and pedagogical teams of the distance learning courses, aiming at the specificities of the students and strategies so that the understanding of what is worked in the course is optimized (COFFERRI *et al.*, 2017).

Most students entering the course had to answer a questionnaire about their previous experiences in courses in distance learning, either as a student, content writer or tutor, and from the analysis of these responses it was found that having had previous experiences with distance learning was not associated with academic performance in the course. The UNA-SUS / UFCSPA FHS course had an initial leveling class regarding the resources of the virtual learning environment used, and the virtual objects of the course. This action possibly mitigated the students' inequalities in terms of their abilities to carry out educational activities.

Access to the computer with internet is indispensable for the realization of courses in the UNF-SUS / UFCSPA FHS model. The course has an estimated at least 390 hours of study, to be carried out in an approximate period of 12 months, which requires about 8 hours of study per week. In order to have enough time to carry out the activities, the professionals had time during their professional activities to study, and thus access to the internet in the work environment was important. Analyzing the presence of internet access at home and in the workplace, it was found that access at home is not associated with performance in the course, but that, surprisingly, those who had internet access at work were more likely to have worse grades than those without access. Perhaps this is explained by the fact that when carrying out the course activities in the work environment, the professional shares his attention with the other tasks of the profession; while those without access, although they have less time available for the course, when they dedicated themselves at home, were totally immersed in the learning process. The weekly frequency of using the computer also did not show any association with performance in the course, which may indicate that regardless of the habits of using the computer prior to the course, the students are able to manage their time to carry out activities.

The work with secondary databases, as in the present study, has some limitations, such as the lack of standardization of information and the absence of specific data for part of the sample. The analyzed database was built from information from students who were organized in 16 classes, who started the course at different times within the 7-year period.

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Thus, some data, such as those related to the students 'previous experiences with distance learning activities, were not collected in a standardized manner throughout the students' enrollments. The type of analysis proposed by the present study must be analyzed in the light of temporality, as information and communication technologies, a basic tool of distance education, undergo constant changes. These changes are accompanied by the way their users interact, understand and mean. In addition, the object of study, a specialization course in the health field, also has specificities that may reflect on learning. Learning in the exact sciences, for example, differs from learning in the health field. Despite these limitations, according to the understanding of the authors of the present work, it brings an original analysis to the literature, given the use of statistical analyses adjusted for various factors, the study of a specialization course in the health area, and the important sample size.

Finally, when interpreting the data from the present study, it must be considered that the studied course was designed and offered to meet a demand for national policies, always being specifically aimed at professionals working in primary health care, unlike free demand courses. Therefore, the extrapolation of data must be done sparingly, considering this specificity. All editions of the course were fully funded by the Ministry of Health, and their completion was mandatory for professionals from the PROVAB and Mais Médicos.

The student profile of the Specialization Course in Family Health at the UNA-SUS / UFCSPA is quite diverse, with a slight predominance of women and Brazilians. The diversities found are associated with academic performance in the course. Among the characteristics that deserve attention due to their association with worse academic performance are the male gender, aged over 25 years and the student's region of origin.

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