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Motivating factors to the completion of subjects in distance learning: A Study Using Self-Determination Theory

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ABSTRACT

This study aimed to identify the motivational factors that affect the students of campus undergraduate in demand for subjects taught in distance mode. We applied a questionnaire in a sample consisting of 217 students of a public institution. The data collection instrument had 5 descriptive questions, 3 essay questions and 11 dichotomous questions. In the methodological procedures, we estimated some logistic regressions and we did some content analyses seeking to identify why some students have motivation for conducting courses in the distance mode while other students have not. As main results, we found that intrinsic and extrinsic factors affect students' motivation for conducting subjects taught in distance education mode. We found also a strong prejudice related to distance learning, generated mainly by suspicion about the quality of teaching of this mode of education.

KEY-WORDS: Subjects in distance education. Distance learning. Academic motivation. Self-determination theory. Logistic regression.

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Fatores Motivadores da Realização de Disciplinas em EAD: Um Estudo sob a Ótica da Teoria de Autodeterminação

RESUMO

No presente trabalho, o objetivo foi identificar os fatores motivacionais que influenciam os estudantes do curso de graduação presencial na busca por matérias ministradas na modalidade a distância. Foi aplicado um questionário em uma amostra formada por 217 discentes de uma IES pública. O instrumento de coleta de dados contou com cinco perguntas descritivas, três dissertativas e 11 dicotômicas. Foram estimadas regressões logísticas e realizada análise de conteúdo buscando identificar por que alguns estudantes apresentam motivação para a realização de disciplinas na modalidade a distância enquanto outros discentes não. Como principais resultados, comprovou-se que fatores intrínsecos e extrínsecos aos estudantes influenciam na motivação por realização de matérias lecionadas em EaD. Constatou-se, ainda, que há um forte preconceito relacionado à educação a distância, gerado, principalmente, pela desconfiança quanto à qualidade do ensino dessa modalidade.

PALAVRAS-CHAVE: Disciplinas EaD. Ensino a distância. Motivações acadêmicas. Teoria da autodeterminação. Regressão logística.

1 INTRODUCTION

Since the publication of the Decree n. 4,059, dated from December 10th 2004, the Brazilian Ministry of Education (MEC) has allowed Higher Education Institutions (HEIS) in the country to introduce, in pedagogical organization and curricular of their undergraduate courses, subjects in the semipresencial modality, since that this offer does not exceed 20% of the total hour classes of the courses.

As the advocates of the distance learning (EaD) argue, in contemporary society, the possibility of attending virtual subjects presents itself as a new form of learning, which, among other benefits, allows the students' time optimization, since the only requirement to catch up with the subjects shall be access to worldwide computer network (Cornacchione Jr., New & Trombetta, 2007). In addition, fans of the virtual way of education affirm that t EaD has a great pedagogical potential, to the extent that enables greater spread of education, being, in this way, an important instrument of exchange and coordination of knowledge among the different virtual learning communities (Abu-Al-Aish & Love, 2013).

In this context, this study attempts to answer the following research question: What are the factors that can motivate the in-class undergraduate students to study subjects in *online* modality over the higher education courses? Therefore, the aim of this research is to identify the motivational factors that influence the in-class undergraduate students in the search for subjects taught in the distance learning modality.

The justification for this research lies in the fact that the demand for EaD have increased considerably in recent years, but in a smaller proportion of the vacancies offered (Emanuelli, 2011). For example, in Brazil, in the year 2002, approximately 24 thousand vacancies were offered in undergraduate courses in distance learning. In 2011 around 1.2 million were offered (Inep, 2014). However, the rate of filling up (entrants in relation to the number of vacancies offered) has fallen from 85% to 35% during this period. For the in-class undergraduate courses, it is observed that, in 2011, there has been a filling up of 73%, i.e., more than the double

of the distance learning courses. This fact shows that the demand for distance learning courses has increased significantly, however, there is still a considerable idle capacity (65% of the vacancies are not being filled up), suggesting that there is still a lack of knowledge about what leads students to adopt this education modality.

In addition, it is important to check what the factors are that motivate students to in-class undergraduation to study subjects in *online* modality, so that the HEIS can better understand the demand of their students and thereby offer courses in distance education that are appropriate to the needs and aspirations of the students. It should be emphasized that the present study is limited to the case of students of a public Brazilian HEI. The justification for this delimitation is based on the fact that, for institutions like this, the introduction of *online* subjects in the curriculum may mean a reduction in maintenance costs of the undergraduations, allowing greater efficiency regarding the public spending and affecting, consequently, the society as a whole. Thus, to the extent that the subjects offered in *online* modality they do not have any restrictions verified to the subjects offered in in-class modality (as the maximum physical capacity of the classrooms), it is possible to reduce the costs of public IHES to introduce subjects in this learning modality.

Furthermore, when studying the motivation of in-class undergraduation students concerning their attending courses at distance learning modality, there is the possibility to extend these results to courses in EaD and, thus, to better understand what leads individuals to adopt this learning modality, improving its attractiveness and, consequently, increasing the filling up of unfilled vacancies.

2 LITERATURE REVIEW

The study of students' motivation is not one of the easiest task to perform, because the motivation concerns a large and complex construct, which relates to internal and multidetermined guidelines. This circumstance allows the topic to be approached from various perspectives, when it comes to investigations in this subject area. The motivation is related with the

force that moves a particular person, pushing it to the achievement of a goal, which can be understood as a set of psychological, physiological, intellectual and affective factors able to determine, together or separately, the action and the conduct of an individual (Carmo, 2014).

The self-determination theory appears as one of the most used for educational contexts (Vallerand et al., 1992; Guimarães & Boruchovitch, 2004; Neves & Boruchovitch, 2004; Reeve, Deci & Ryan, 2004; Joly & Prates, 2011; Loyal, Miranda & Carmo, 2013). The self-determination theory, as Deci and Ryan (1985), differs from the various types of motivation, with the objective of verifying what specific motivation is more important than the others to predict or influence certain behaviors. These authors, based on the work carried out by White (1975), DeCharms (1984), and Bowlby (1990), have different levels of motivation, which can be grouped into three different sets: intrinsic motivation, extrinsic motivation and demotivation. The logic is that, so that a human being feels intrinsically motivated, it is necessary that three fundamental elements are met: autonomy, competence and sense of belonging (Deci & Ryan, 2000).

For DeCharms (1984) and Reeve et al. (2004), the sense of autonomy occurs when individuals perceive a locus of internal causality and the see themselves as agents and origin of the actions themselves. In this sense, for an agent intrinsically motivated, the realization of the activity is understood as the reward itself.

The need of competence, in turn, is related to the work of White (1975) and means that certain individual needs to learn and develop capabilities required by the environment in which he or she operates. While mastering challenging tasks can provide increased competence, the individual would attain a sense of effectiveness (White, 1975).

Whereas the sense of belonging, on the other hand, is related to the perception of safety in relationships of individuals and, in the context of research related to education, it applies to relationships of students with the various stakeholders regarding the environments of schools and/or universities, such as parents, the other students, teachers and staff, for example. According to the literature, the sense of belonging keeps strict relation with the autonomy, the internal control, the good relationship with

authority entities and with their peers (Guimarães & Boruchovitch, 2004). In addition, in the context of education, literature on the subject has identified that the intrinsic motivation of individuals presents itself as an important factor facilitator of learning and, consequently, the students' performance (Deci & Ryan, 2000). Whereas in the case of extrinsic motivation, the student involves himself or herself in activities with the aim of achieving a given task and obtaining external, material or social rewards (Neves & Boruchovitch, 2004).

It should be highlighted that, for Williams and Burden (1997), motivation is a complex and multidimensional construct. Thus, the internal and external influences should not be seen in Manichean terms, i.e., an individual may have both intrinsic (internal) as extrinsic (external). This circumstance justifies the fact that, in the present study, dealing with the motivation as a desire, willingness, stimulation, which can vary from individual to individual and lead him or her to or not to perform certain action, as it is claimed by Ribas and Perine (2014).

The Motivation, therefore, depends on personal internal factors (beliefs, expectations, prejudices, for example) and external (parents, friends, cultural norms and expectations and social attitudes, for example) and is influenced by experiences of previous learning, and may not be separated from factors related to the context of learning, components and features that are specific to a course (Ribas & Perine, 2014).

2.1 DISTANCE LEARNING

For MEC (2015), EaD is the learning modality in which the didactic-pedagogical mediation in the processes of teaching and learning occurs with the use of technological means of information and communication, with students and teachers developing educational activities in places or different times.

Since its appearance, EaD is understood as a form of inclusion, since it allows individuals resident in distant or isolated areas to acquire knowledge. In this context, according to Almeida (2003), the association of traditional technologies of communication, such as radio and television,

ways of quick issuing of information and printed materials sent via mail leveraged EaD, favoring the spread and the democratization of access to education at different levels, thus completing the yearning for several students who could not or did not want to join the in-class learning modality.

Notwithstanding, when it popularized, it demanded from its followers a set of skills that were not so important in the in-class learning. Thus, for Tarouco, Moro and Estabel (2003), among other things, it became essential the growth of the interaction between learners and between learners and teachers-tutors, since there is no physical proximity between educators and learners, it began to be necessary to establish new forms of contact that would allow the development of teaching and learning.

In this sense, comparing the EaD characteristics with in-class learning, it can be concluded that these two modalities of teaching, although aim at the transmission of knowledge, differ substantially from one another. According to Ferreira, Mendonça and Mendonça (2007), while the in-class learning is concerned with the unit, allowing the Professor to help the student, controlling them, EaD, which works with the massive teaching, has students who do their own studying schedule and, consequently, they control themselves.

In recent times, there were studies that seek to know the EaD supporters' profiles, as well as the necessary skills for the students so that teaching-learning relation takes place, attempting to prevent the distance courses available on the market do not frustrate the students' expectations who use it, or that will use this type of teaching modality to improve themselves (Margaryan, Littlejohn & Vojt, 2011; Behar & Silva, 2012; Fragalli, Silva, Almeida & Frega, 2013; , 2014).

3. METHOD AND RESEARCH TECHNIQUES

This study may be classified as explanatory and descriptive because, besides illustrating what factors motivate the in-class students to take distance learning subjects, it seeks explanations for the factors found. This

is a bibliographic research and *levantamento* (*survey*) and uses both quantitative and qualitative techniques (Lakatos & Marconi, 2007).

The data collection instrument of research is composed of 19 questions (five descriptive; three open and 11 dichotomous ones) and was applied to in-class undergraduation students from a public HEIS located in Belo Horizonte, Minas Gerais. The final sample of research is composed of 217 questionnaires answered by students from various undergraduate courses such as administration, Computing Science, Accounting, Controlling and Finance, Pedagogy and Biological Science. Data collection was carried out in December 2014, with those students who agreed to participate voluntarily in the study, by signing the informed consent form included in the instrument. The sample was chosen for accessibility and all the questionnaires were considered valid. In the econometric model used, worked with *dados faltantes* (*missing data*) for those cases in which one or more questions left to be answered by students.

The questionnaire was elaborated based on previous research that showed what could influence students to attend a subject in distance learning modality. From one of the closed questions in the questionnaire, it was possible to segregate students of the sample into two groups: those who are interested in studying a distance learning modality subject, and those who do not have this interest. So, from this segregation and using the remaining closed questions of the instrument as explanatory variables, it was estimated a model of logistic regression in order to identify which of them could be considered statistically significant to explain the propensity of respondents to attend one or more subjects of in-class modality in EaD. To achieve this, it was used the software Stata 12.

From the three dissertative questions of the questionnaire, it was possible to perform a content analysis with the aim of identifying why some students do not have motivation to study subjects in distant learning modality.

3.1 TREATMENT OF VARIABLES IN THE LOGIT MODEL

The variables used to estimate the logistic regression model was constructed from the data collection instrument. Based on the 19 questions of the questionnaire, it was possible to build a dependent variable and 13 independent variables for the *logit* model. It is worth mentioning that not all questions in the questionnaire were used for the estimation of logistic regression.

As presented below, the explanatory variables used to estimate the model of logistic regression were segregated into three groups. In the first of them, the variables related to the descriptive characteristics of students are found, which may be associated to a greater or lesser likelihood of motivation for achievement of subjects in *online* modality, such as gender and age. In the second group, are the variables related to the extrinsic factors to students, which may interfere with the motivation of students for performance or not of subjects in the modality EaD, as the fact of the teachers or the course itself use information and communication technologies to deliver the students' learning. Finally, in the third group, the explanatory variables were compiled regarding the intrinsic factors to the student, such as his or her facility dealing with technological tools.

3.1.1 Dependent variable

"Y": created on the basis of the question of the questionnaire: "Would you study one or more subjects of your undergraduation course in the distance learning modality?". It was assigned a value of 1 for students who answered 'yes' and 0 for those who answered "No". Thus, the logistic regression estimated is measuring the probability of a student to be or not inclined to perform one or more subjects of his or her in-class undergraduation course in on-line modality.

3.1.2 Independent descriptive variables

"Age": This variable in the questionnaire, was transformed into a dichotomic since there was no clear indications that it had linear relationship with the dependent variable "Y" as required by the model of logistic

regression (Cunha et al., 2000). Thus, it was assigned the value 1 to students who were more than 20 years when they answered the questionnaire and 0 to students who were less than 20. In this study, it is believed that older students have a greater propensity to be motivated to perform one or more subjects in EaD modality, since, the older the student, the greater are the chances that he or she is operating, somehow, in the labor market. As the *online* subject features better possibility of flexibility (it can be done from anywhere at any time) it is more likely that students who work and study at the same time have a greater probability of being motivated to perform a subject in EaD. Additionally, the literature has revealed that older individuals are more likely to take a course in EaD modality (Carmo, 2014).

"Gender": variable based on the question of the questionnaire on the gender of the respondent. It was assigned the value of 1 to the students who responded to be male and 0 to students who reported being female. In this work, it is believed that the men are more likely to be motivated to perform one or more subjects of their undergraduate course in *online* modality, given the affection of this group of individuals for technologies.

"Marital status": variable based on the question of the questionnaire on the Marital status of the respondent. It was assigned the value equal to 1 when the individual is declared "married", "in a stable union" or "divorced" and 0 when he or she declared to be "single". The intuition behind this measure is that students who are married, in a stable union or divorced have a more turbulent life style, having various obligations than the single students, who very probably, do not have. Therefore, the first group of individuals (those classified with the value equal to 1) could present major concerns to the flexibility enabled by EaD modality.

"First year": variable based on the question about the semester that the respondent was attending. It seeks to measure whether students who are in the first year of the course are less likely to achieve a subject in EaD than learners who have higher university experience (are there more than a year in higher education). Thus, individuals who were enrolled in the first year of their graduation when replied to data collection instrument received a value of 0 and those who had more than a year of higher education

received the value 1. It is believed that newcomer students to the HEI have a memory of learning related to secondary education still very rooted, which would make them less likely to test new methods of teaching. For this group of students, having a teacher in a physical environment with which he or she can get in touch directly and in an in-class form may be a necessary condition so that learning occur. Whereas for the students who have been more than a year in contact with the university environment, the figure of the teacher may not be the most important for learning to occur, releasing space so that new ways of teaching take place.

3.1.3 independent variables of extrinsic motivation

"Course Incentive": created on the basis of the question of the questionnaire: "In your opinion, Does the undergraduate course that you are doing encourage the use of information and communication technologies to contribute with your learning?". It was assigned a value of 1 for students who answered 'yes' and 0 for those who answered "No". It is believed that to be enrolled in a course that encourages the students to use information and communication technologies causes an increase in the motivation of the individual to attend courses in the distance learning modality.

"Professors incentive": variable based on the question of the questionnaire: "In your perception, Do your teachers use information and communication technologies in order to contribute with your learning?" It was assigned a value of 1 for students who answered 'yes' and 0 for those who answered "No". It is believed that to have teachers who encourage the students to use information and communication technologies cause an increase in motivation of students in relation to study subjects in EaD modality.

"Failing": variable based on the question of the questionnaire: "In case you had already done one in-class subject and failed in this subject, being forced to study it again, do you believe that it would be better to study it in distance learning modality?" It was assigned a value of 1 for students who answered 'yes' and 0 for those who answered "No". The

intuition behind this variable is that, when he or she failed in a classroom subject required of the undergraduation course of period x of the course, the student would be prevented from attending some(s) subject(s) of the period *x+1*. In this context, by introducing the possibility of attending in *online* modality one subject in which he or she failed, the problem of schedule overlapping would not exist.

"EaD familiarity": variable based on the question of the questionnaire: "Do you have any close relative or close friend who has already studies some course or subject in distance learning modality?". It was assigned a value of 1 for students who answered 'yes' and 0 for those who answered "No". It is believed that learners who have had contact with any close friend or close relative with positive experiences related to distance learning have a higher probability of being motivated to perform one or more subjects of the in-class undergraduate course in EaD modality. It is also believed, that contact with people who have experience with *online* courses help and to reduce possible prejudices that the in-class course students may have regarding this learning modality.

3.1.4 independent variables of intrinsic motivation

"Experience": variable based on the question of the questionnaire: "Have you ever studied any course or subject in distance learning modality (even if not connected to the course you are enrolled today?". It was assigned a value of 0 for students who answered 'no' and 1 for those who answered "yes". It is believed that having past experience with EaD increases the probability for the learner being motivated to perform one or more disciplines of their undergraduate course in distant learning modality, since these individuals have greater knowledge of how the lessons in EaD work.

"Tutorials use": variable based on the question of the questionnaire: "At some point have you have sought knowledge through tutorials or videos available on the Internet free of charge or paid?" It was assigned a value of 0 for students who answered 'no' and 1 for those who answered "yes". It is believed that learners who seek knowledge for their own account on the

Internet would be more likely to present motivation to study disciplines of their in-class undergraduate courses in EaD modality. The intuition behind this reasoning is that students who have had this attitude have a profile very close to that required for the completion of *online* courses.

"Believe in learning": variable constructed from the following question in the questionnaire: "Do you believe you would learn a content in a subject in the distance learning modality with the same degree of difficulty/facility that an in-class subject?". It was assigned a value of 0 for students who answered 'no' and 1 for those who answered "yes". This variable seeks to analyze the relationship between the students that believe that learning acquired in these *online* courses and in-class take place with the same difficulty/facility and the motivation to attend subjects in EaD modality. In this study, it is believed that students who consider that learning of in-class learning and *online* have the same level of difficulty/ease have a greater probability of being motivated to perform one or more subjects of the undergraduate course in *online* format. The intuition, therefore, is that to be motivated to perform a distance learning subject, the learner must believe that the learning that he or she will get with this type of education(*online*) will be the same that he or she would obtain if he or she were doing an in-class modality.

"Facility in using tools": variable constructed from the following question in the questionnaire: "Do you think you have ease in relation to the use of technological tools (*smartphones*, computers, *notebooks*, *softwares*, for example)?". It was assigned a value of 1 for students who answered 'yes' and 0 for those who answered "No". This variable seeks to measure whether students who have difficulty in dealing with the tools used in the distance learning disciplines would be more likely to perform one or more subjects of the in-class undergraduate course in the EaD format. According to the literature researched, there is evidence that the larger the facility in relation to the use of technological tools, the more motivated the student will be with regarding the accession to EaD (Fragalli et al., 2013).

"Use communication tools": variable constructed from the following question in the questionnaire: "Regarding social media (*Facebook*, *Twiter*, *Whatsapp*, *Skype* and others), do you use them daily?". It was assigned a

value of 1 for students who answered 'yes' and 0 for those who answered "No". It is believed that students who use daily social media by means of technological tools would be more likely to perform one or more disciplines of their in-class undergraduate courses in an *online* modality.

4 PRESENTATION AND RESULTS ANALYSIS

4.1 DESCRIPTIVE ANALYZES

In Table 1, it is presented the descriptive analysis of the respondents of the survey. As it is possible to see, the sample formed by 217 students from a public HEI in Brazil had an average age of 24.12 years, representing a profile a little older than you would expect to find when working with students. However, the high average age may be explained due to the sample standard deviation have been six years, with maximum age observed of 54 years. In addition, it is possible to realize that 51.62% of the sample was formed by students of the female gender and 88.43% of the students respondents declare themselves single. It is important to highlight that 24.42% of the sample was in the first year of their respective undergraduate courses.

Table 1: Respondents' profile

Characteristic	Percentage
Age	24.12 (average in years)
Female gender	51,62
Single	88,43
Studying the 1st year of the undergraduation course	24,42
Composition by Undergraduate Course	
Science Accounting course students	47,22
Administration course students	14,13
Computer Science course students	10,19
Pedagogy course students	8,80
Other undergraduation course students	19,66

In addition, still according to the data presented in Table 1, the composition of the respondents of the sample by undergraduate course demonstrates that a large proportion of them come from management areas (Accounting Science - 47.22% - and Administration - 14.13%).

Despite of this, other courses like Computer Science (10.19%) and Pedagogy (8.80%) also presented relevance in the composition of the survey performed.

4.2 ESTIMATION OF THE LOGISTIC REGRESSION MODEL

The logistic regression model was estimated with the objective of identifying the variables that are related to the probability of the student being motivated to study one or more disciplines of his or her in-class undergraduate course in EaD modality. As described earlier, the explanatory variables were extracted from the questionnaire applied to students of various courses of a public Brazilian HEI.

So, 13 variables were constructed that were listed into three groups, with a view to the theoretical intuition behind each one, namely: (i) descriptive variables for students who seek to relate the probability of the student being motivated to attend one or more disciplines in EaD according to their characteristics, such as gender and age; ii) variables extrinsic motivation, which seek to measure the probability of the student being motivated to attend one or more disciplines in EaD influenced by external factors to the student, such as the fact that the Professors and/or the undergraduate course encourage the use of information and communication technologies for learning; and, finally, iii) intrinsic variables of motivation, which seek to measure the probability of the student to be motivated to attend one or more disciplines in EaD due to internal factors to the student, such as the fact that he has some previous experience with courses or disciplines performed in EaD modality.

So, first, it was estimated logistic regressions with each of the 13 variables present in the final data base of the study. The goal of this methodological step is to identify statistically significant variables in explaining the probability of the student be motivated to perform one or more disciplines of an in-class undergraduate course in EaD. For the present study, it was considered significant variables that showed the Wald test (equivalent to the t-test of multiple regressions) significant at the level of up to 10%.

Thus, in Table 2, it is presented, first the results obtained for the variables of the first group, i.e., for the variables describing the student. It contains the values of the coefficients and *odds ratio* of logistic regressions with their respective standard errors in parenthesis, the Wald test and the test of significance of the model (Div>Chi²). As it is possible to realize, for the group of descriptive variables of students, only the variable "First year" showed statistical significance compatible with the limit established by this research. Hence, given that the coefficient of this variable was positive, it can be stated, at the significance level of 1%, that learners who are more than a year enrolled in their respective divisions have a factor of chance related with the probability of being motivated to perform one or more disciplines in EaD 2.5220 higher than the students who are still in the first year of their courses. The intuition behind the creation of this variable was that learners who have just joined in higher education (they are in the first year of the course) have still a very strong memory for learning related to secondary education. Thus, the figure of the teacher always present in the classroom, as the main responsible for student learning, can lead these students in the first year of in-class undergraduate courses to reject distance learning modality.

Table 2: Results of simple logistic regressions - descriptive variables

Variable	Coeffi-cient	Odds Ratio	Wald Test	Prob>Chi²	N# of remarks	Include in the Model?
Gender	0,2407 (0.3191)	1,2721 (0.4059)	0,451	0,4495	213	No
Marital Status	-0,1827 (0.4766)	0,8330 (0.3970)	0,701	0,7044	213	No
Age	0,5420 (0.3406)	1,7195 (0.5857)	0,112	0,1157	213	No
First Year	0,9250 (0.3469)	2,5220 (0.8747)	0.008***	0,0086	213	Yes

*Significant at 10%; **Significant at 5%; ***significant at 1%.

In Table 3, in turn, it is presented the results obtained for the variables of the second group, i.e., to those related to extrinsic factors of students' motivation. Thus, as evidenced in Table 3, two variables of this group showed statistical significance compatible with the limit established by the work.

Table 3: Results of simple logistic regressions -extrinsic variables

Variable	Coefficient	*Odds Ratio*	Wald Test	Prob>Chi²	N# of remarks	Include in the Model?
Course Incentive	0,0724 (0.4456)	1,0751 (0.4791)	0,871	0,8714	211	No
Professors Incentive	-0,6897 (0.4470)	0,5018 (0.2243)	0,123	0,1044	212	No
Fail	2,7652 (0.5447)	15,8824 (8.6504)	0.000***	0,0000	210	Yes
EaD familiarity	0.6650 (0.3709)	1.9444 (0.7211)	0.073*	0.0784	213	Yes

*Significant at 10%; **Significant at 5%; ***significant at 1%.

The variable "Fail" had a positive coefficient and, consequently, an *odds ratio* greater than 1. Thus, it can be stated, at the significance level of 1%, that the students who were disqualified in a compulsory subject of their courses feel motivated to perform this subject in EaD at the second time. The intuition behind the creation of this variable is that when the student fails in a subject, having attended the lectures of this subject, he or she believes that performing it *online* may be is a way of not blocking the schedules of the subjects of the following semester. In this scenario, the discipline in EaD would work as a facilitator for the academic life of the student, preventing him or her from completing the undergraduate course with delay. Thus, it can be stated that the student who fails in a compulsory subject would accomplish for the second time in EaD modality has a factor of chance related to likelihood of being motivated to perform one or more disciplines of their in-class undergraduate course in distance learning 15.8824 greater than their peers who declared not to perform specific subject when they fail at the in-class course modality.

In the same way, the variable "EaD familiarity" had a positive coefficient and, consequently, *odds ratio* greater than 1, at the significance level of 10%. It is worth mentioning that this variable seeks to measure the effect on motivation of students in performing one or more subjects in EaD modality due to a family member having already taken an *online* course. Thus, it can be stated that students whose friends and/or family members have already made a course in EaD present a factor of chance related to

likelihood of being motivated to perform a subject in *online* modality 1.9444 higher than students who do not have relatives and/or friends who have studied a course in EaD modality. Thus, it is possible to state that there are indications that the familiarity with distance learning courses increases the likelihood of the learner to be motivated to perform one or more subjects of the in-class undergraduate course in *online* modality.

Whereas in Table 4 it is presented the result of the simple logistic regressions estimated with each of the variables related to the third group, i.e., those variables that measure the influence of intrinsic factors to the students regarding the motivation to perform one or more subjects in the distance learning modality. In this way, it is possible to realize that three of the five variables present in this group showed statistical significance, all at the level of 1%.

In this context the variable "Experience" had a positive coefficient and, consequently, an *odds ratio* greater than 1. When creating this variable, the intuition was that students who have participated in some experience in EaD would present a higher probability of being motivated to perform a subject in this modality than their peers who never had contact with this learning modality. Thus, from the results obtained for the simple regression performed for this variable, it is possible to state that students who have already studied some course or subject in EaD modality present factor of chance related to likelihood of being motivated to perform one or more subjects of their in-class undergraduation in EaD 2.3765 higher than students who had never had contact with *online* learning modality. It can be perceived, therefore, that the experience related to distance learning has been shown to be positive for the students of the sample, since that, for those who have had direct contact with this type of learning modality, performing one or more subjects from the in-class undergraduation course in *online* modality is a desirable option.

Table 4: Results of simple logistic regressions -intrinsic variables

Variable	Coefficient	*Odds Ratio*	Wald Test	Prob>Chi²	Number of remarks	Include in the Model?

Experience	0.8656 (0.3307)	2,3765 (0.7860)	0.009***	0,0075	213	Yes
Tutorial use	0,0202 (0.6867)	1,0204 (0.7007)	0,977	0,9766	211	No
Believe in learning	2,0841 (0.4963)	8,0372 (3.9892)	0.000***	0,000	211	Yes
Facility using tools	1,5570 (0.5670)	4,7442 (2.6898)	0.006***	0,0063	210	Yes
Use communication tools	0,3671 (0.5212)	1,4435 (0.7524)	0,481	0,4897	213	No

*Significant at 10%; **Significant at 5%; ***significant at 1%.

Still according to the important information present in Table 4, it is possible to observe that the coefficient of the variable "Believe in learning" was positive and statistically significant at a significance level of 1%. This variable seeks to measure the effect of the student believe that a subject in the EaD modality allows learning with the same degree of difficulty/ease compared to in-class learning modality. Thus, the result of the simple logistic regression for this variable shows that students who believe that EaD learning allows learning in the same degree of difficulty/ease that in-class learning have an odds ratio related to the likelihood of being motivated to perform EaD 8.0372 higher than students who do not believe that EaD learning allows learning with the same level of difficulty/ease that in-class learning.

Finally, the variable "Facility using tools", which seeks to measure the relationship between the learner to find it easy to handle technological tools (such as computers *tablets*, *smartphones*, for instance) and the probability of the student to be motivated to perform an EaD subject, also presented statistical significance at the level of 1%. In this context, since that the *odds ratio* of the simple logistic regression estimated for this variable was found to be greater than 1, it can be stated that students who reported to find it easy to use technological tools have an odds ratio related to the likelihood of being motivated to perform one or more disciplines of the in-class undergraduation course in the distance learning modality

4.7442 higher than students who did not find it easy to deal with technological tools..

Thus, the model I was formed by a set of six variables, one belonging to the group of descriptive variables ("First year"); two, the group of extrinsic variables ("failure" and "EaD familiarity"); and three belonging to the group of intrinsic variables ("Experience", "Believe in learning" and "Facility using tools").

In Table 5, it is presented, therefore, the result found for the estimation of the model I to use in all variables that showed statistical significance from simple logistic regressions performed (Table 2, Table 3 and Table 4). As it is possible to observe, four of the six variables present in the Model I showed significance at the level of up to 10%. Nevertheless, it is important to highlight that all variables present in the model I, including those that were not statistically significant, presented coefficients with the same signs of those recorded at the estimation of their logistic regressions. In this context, the theoretical interpretations of the results remain the same from those performed earlier.

Thus, from the results found for Model I, it can be stated that the student who has a higher probability of being motivated is the one that: i) has already passed the first year of graduation; ii) to fail in an in-class mandatory subject, would choose to perform it in the distance learning modality; (iii) believes that the learning of an EaD subject exhibits the same degree of difficulty/ease that an in-class modality subject; and (iv) finds it easy to use technological tools, such as *notebook*, *smartphones*, *tablets*, among others.

To find the final model of the study, it was eliminated from the model I the two variables that showed no statistical significance at the level of 10%, namely: "EaD familiarity" and "Experience"". Thus, the model II, shown in Table 5, was formed from a descriptive variable ("First year"), an extrinsic variable ("Fail") and two intrinsic variables to the student ("Believes in learning" and "Facility using tools").

Being used the command *Stepwise*, it was estimated in *software* Stata 12 a model with all 13 variables constructed on the basis of the questionnaire applied, requiring a significance level of 10%. In this context,

also from the *Stepwise* procedure, the model formed has the same variables in the model II, proving the efficiency of the model built.

After the estimation of the model II, therefore, it was possible to realize that all four variables were statistically significant within the limits adopted for this work, as also evidenced in Table 5. In addition, as occurred for the model I, the coefficients found for the variables in the model II displayed the same signs of those recorded at the estimation of their simple logistic regressions, meaning, therefore, that the theoretical constructions built for these four variables were maintained. In this sense, it is possible to realize that students who studied more than a year of his or her undergraduation course have a chance regarding the likelihood of being motivated to perform one or more disciplines of the undergraduation in EaD modality 2.5333 higher than the students who are in their first year of higher education, at a significance level of 5%. As previously mentioned, this result can be associated with the fact that students who are in the first year of the undergraduation course still have a very strong memory of learning related to secondary school. Thus, very probably, in the vision of these students, the teaching-learning relationship occurs in a satisfactory manner only when it has a figure of the teacher in the classroom, with which you can establish some in-class relationship. In contrast, learners who are after the first year of the undergraduate course, because they have already a better university experience, they know that learning in the context of higher education can occur in several ways besides the Student-Professor relationship, which opens up opportunities for experimentation with new methods of teaching.

Table 5: Result of the estimation of models of research

Variables	Model I			Model II		
	Coefficient	***Odds Ratio***	**Wald Test**	**Coefficient**	***Odds Ratio***	**Wald Test**
Constant	-2,6005 (0.8485)	0,0742 (0.0630)	0.002***	-2,4059 (0.7926)	0,0902 (0.0715)	0.002***
First Year	0,7818 (0.4586)	2,1855 (1.0023)	0.088*	0,9295 (0.4381)	2,5333 (1.1097)	0.034**

Fail	2,4426 (0.5937)	11,5026 (6.8286)	0.000***	2,5011 (0.5867)	12,1954 (7.1549)	0.000***
EaD familiarity	0,2158 (0.4491)	1,2409 (0.5573)	0,631			
Experience	0,5163 (0.4217)	1,6759 (0.7067)	0,221			
Believe in learning	1,6462 (0.5958)	5,1873 (3.0908)	0.006***	1,5716 (0.5777)	4,8144 (2.7812)	0.007***
Facility using tools	1,8917 (0.6978)	6,6307 (4.6269)	0.007***	1,9748 (0.7059)	7,2055 (5.0862)	0.005***
	Number of Remarks = 205			Number of Remarks = 205		
Prob>Chi² = 0.0000				Prob>Chi² = 0.0000		
PseudoR² = 0.2942				PseudoR² = 0.2853		
*Significant at 10%; **Significant at 5%; ***significant at 1%.						

In addition, it is possible to perceive, even according to Table 5, that students who said that would study a subject in EaD in case of failing in this subject when it was held in the in-class modality have a chance regarding the likelihood of being motivated to perform one or more disciplines in distance learning modality 12.1954 greater than learners who said they would not study a subject in EaD if they failed in this subject when it was held in an in-class modality. Due to the expressive significance of *odds ratio* of the variable "Fail", it can be inferred that a large part of the student's motivation in performing a subject in his or her undergraduation course in the distance learning modality would be in the benefit of combining subjects which, if they were carried out in the in-class modality, would block the students' schedule grid.

Additionally, according to the results obtained for the variable "Believe in learning", it can be stated that students who believe that learning in the in-class subjects and EaD occurs with the same difficulties/facilities have a chance ratio related to the likelihood of being motivated to perform one or more subjects of in-class undergraduation in *online* modality 4.8144 higher than students who do not believe in equality of this learning. This result indicates, therefore, that learners who are motivated to perform a subject in EaD really believe that this learning will be of quality, not differing in nothing of learning obtained when the subject is in an in-class modality.

Finally, the results for the variable "Facility using tools" show that students who consider it easy to use technological tools have an odds ratio regarding the motivation in studying one or more subjects of his or her

undergraduation course in an *online* modality 7.2055 higher than students who reported not finding it easy to use technological tools. Thus, it can be inferred that students who do not dominate the use of technological tools believe that they will have difficulties in monitoring the subject given the distance, in view of the inseparable relationship between the subject taught in EaD and the use of technological tools.

After the estimation of the model II, it became necessary to check what its ability to adjust was. In this way, as presented in the Table 6, it was calculated the matrix of classification of the final model of the work.

Table 6: Matrix of classification for the Model II

Classification	Motivated (sample)	Not motivated (sample)	Total
Motivated (Model)	145	31	176
Not motivated (Model)	10	19	29
Total	155	50	205

As it is possible to observe, the Model II correctly classified 145 of 155 cases of students who were motivated to perform one or more subjects of his or her undergraduation course in distance learning modality. Furthermore, the model II correctly classified 19 of 50 cases of students who were not motivated to perform one or more disciplines of his undergraduation in EaD. Nevertheless, 31 observations were classified by the Model II as being of students motivated when in fact they were of students not motivated to perform one or more disciplines of graduation in the distance learning modality. Finally, ten cases were classified as being of students not motivated when in fact they were students who had motivation for achievement of disciplines in *online* modality.

Thus, as described in Table 7, the classification capacity of the model II was 80%. Nevertheless, the classification capacity related to students motivated to perform disciplines in EaD (sensitivity) is 93.55%, while the classification capacity related to students not motivated (specificity) is 38%. In this context, given that the purpose of this study is

to identify the factors that motivate the students to perform a subject in the *online* modality, it can be said that the maximization of sensitivity is the most important for the results of this study.

Table 7: Qualifier power of the Model II

Classified power	Calculation	Percentage
Sensitivity	145/155	93.55
Specificity	19/50	38.00
Value predicted for motivated students	145/176	82.39
Value predicted for non-motivated students	19/29	65.52
False classification for motivated students	10/155	6.45
False classification of the non-motivated students	31/50	62.00
False classification for the motivated students of the model	31/176	17.61
False classification of the non-motivated students of the model	10/29	34.48
General qualifying power	(145+19)/205	80.00

In addition, even in relation to the classification capacity of the model II, it can be said to be correct in 164 cases out of a total of 205 (80%), using only four variables, it is a strong indication that model II is well adjusted. Nevertheless, in order to have more clues about the ability to adjust the final model of the study, it was calculated still the ROC curve (*Receiver Operating Characteristic*). According to Gerard, Belfiore, Silva and Chan (2009), the greater the area under the ROC curve, the greater the capacity is of the model discriminate the groups of interest (which for this research are the groups of motivated and not motivated students to perform one or more disciplines of the in-class undergraduation course in the EaD modality). In contrast, the closer the ROC curve is of the diagonal line, the worse the discriminatory power of the model is. According to the authors, when the area under the ROC curve shows a value greater than 0.8, it is possible to sort the discrimination held by the model as excellent; whereas when it is between the value of 0.7 and 0.8, the discrimination of the model is acceptable; and, finally, when the area under the ROC curve is less than or equal to 0.5, it can be stated that there is no discrimination in the model. In this way, as presented in Figure 1, the area under the ROC curve drawn to the model II is equal to 0.8407, conferring a power of discrimination considered excellent.

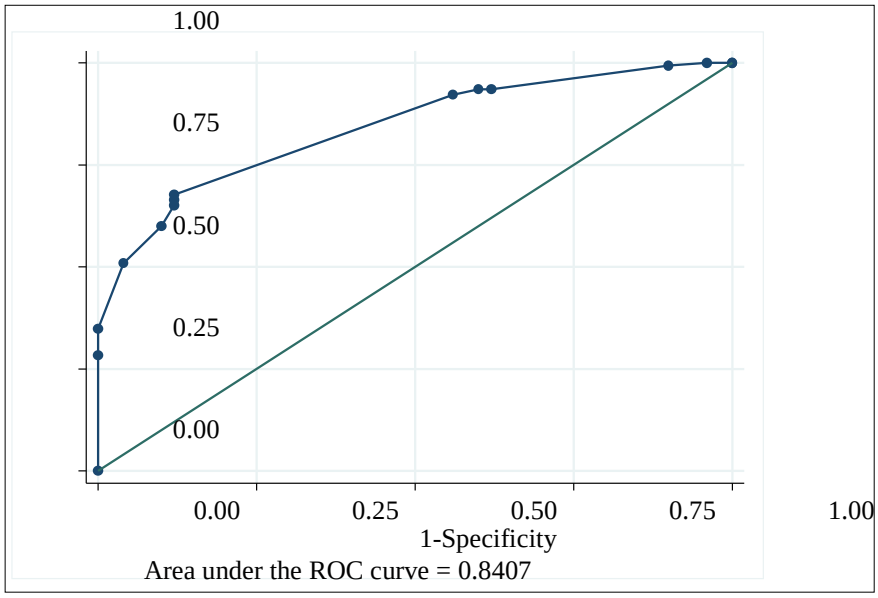

Figure 1: ROC model – Model II

It was accomplished, also the Hosmer-Lemeshow test, which seeks to test the hypothesis of absence of differences between the expected results and the observed ones. Thus, according to the level of significance adopted by the survey (10%), it was possible to accept the null hypothesis that there is no difference between the results provided by the model and the observed in the sample, since the *p-value* of the mentioned test was equal to 0.7955.

According to Fávero et al. (2009), the models of logistic regression must comply with both the assumption of absence of multicollinearity and the absence of heteroscedasticity. This way, when accomplishing the test of multicollinearity in the model II, it was possible to confirm that it is not multicolinear, once that the VIF test has indicated that the greatest collinearity is equal to 1.20. According to Gujarati (2006), the value VIF limit to establish that a variable is not collinear is equal to 4, and, if this value is greater than 10, the variable can be considered highly collinear.

Whereas through the test of heteroscedasticity it was possible to confirm that the model II is not homoscedastic since both the test of Breush-Pagan-Godfrey, as the White allowed to reject the null hypothesis of Homoscedasticity. In this sense, it became necessary to perform any correction for the standard errors of the explanatory variables of the model II, once its Wald tests could be incorrect. It should be emphasized,

however, that the tests that aim to correct the problem of heteroscedasticity does not alter the value of the coefficients of the variables in the model to be corrected. Thus, the theoretical interpretation of the variables in the model II will remain the same after the correction of the model, because the signal of the coefficient and the value of the *odds* of the variables will remain unchanged.

It was carried out a survey of tests used to fix the problem of heteroscedasticity in logistic regression models and it was identified that the test of robust correction of White is one of the most used in the literature (Cançado & Araújo Júnior, 2004; Araújo & Ramos, 2009; Birth, Cardoso, Brito & Coronel, 2011; Jennings, Machado & Lima, 2011). In this context, to fix the problem of heteroscedasticity of the final model of this study, it was used the robust correction of White.

The results of the correction indicated that all the variables in the model II continued presenting statistical significance regarding the correction of heteroscedasticity. Nevertheless, even the Wald test having changed the value of significance of the variables, since the standard errors were altered, it was possible to realize that the constant and the explanatory variables "Fail", "Believe in learning" and "Facility using tools" continued to have statistical significance at the level of 1%. Moreover, the explanatory variable "First year" continued with its statistical significance at the 5% level. It is worth mentioning that the robust correction of White for the heteroscedasticity also does not alter the value of the pseudo R^2 of Model II (which is the R^2 of MacFadden), which continues to be equal to 0.2853.

Thus, given the results of the tests performed, it could be observed that the Model II is well adjusted and, furthermore, that it is efficient to estimate the probability of a student enrolled in an in-class course in a public HEI being motivated to perform a subject in EaD modality. Therefore, the final model of the study presents, in addition to a descriptive variable of students ("First year"), two variables related to intrinsic factors of motivation ("Believe in learning" and "Facility using tools") and a variable related to an extrinsic factor of motivation ("Fail").

4.3 ANALYSIS OF THE DISCURSIVE RESPONSES OF THE QUESTIONNAIRE

Aiming to identify the main reasons for which learners do not have motivation to perform one or more disciplines of their undergraduation courses in EaD, it was performed a content analysis on the responses of three dissertative questions present in the data collection instrument of the research.

In this context, it was possible to identify two main factors that lead students to not to want to perform one or more disciplines of their in-class undergraduation courses in distance learning modality. The first one relates to the possible difficulties arising from the autonomy that EaD gives the student, i.e., they stated that they would have difficulty "especially [with respect to] organization and subject studying constantly (...)". In addition to this, another question often mentioned shows a lack of knowledge about how the EaD is worked or even any prejudice on the part of the student, because some students had statements like "the classroom is a place where we focus more on what is taught." I think that the distance learning modality indirectly jeopardizes it". Along the same lines, another student contends that the main difficulties which might appear to perform disciplines in EaD is related to "the lack of channels to resolve my doubts, difficulty in considering the most relevant aspects in the curriculum of subject".

It was found some cases in which the problem identified by the learner is related to the doubt regarding the capacity of distance learning modality to generate quality knowledge, since there were statements such as "the difficulty would be the subject to follow the course besides believing that knowledge would not be absorbed by complete".

It was possible to realize, still, that there is a strong doubt about the support that the subject taught in EaD is able to provide for their advocates. In this context, one of the respondents stated that the main reason for not wanting to perform one or more disciplines of their undergraduation course in EaD is related with the "absence of a mentor, especially [for] problems with the technological support". In the words of another student, "the lack of physical presence of a teacher, which would give me more accessibility to

consult him" is presented as the main reason for the demotivation to EaD modality.

FINAL CONSIDERATIONS

The aim of this research is to identify the motivational factors that influence the in-class undergraduate students in the search for subjects taught in the distance learning modality. For this reason, it was developed a data collection instrument, consisting of 19 questions, which enabled the scope of the objective established. From a final sample of 217 students of Administration courses, Computer Science, Accounting, Controlling and Finance, Education and other undergraduation courses from a public HEI, it was identified that the substantial majority of these students would study a subject in distance learning modality (74% of respondents). Nevertheless, as advocated by the self-determination theory, it was possible to confirm that students have both intrinsic factors and extrinsic motivation for achievement of disciplines in EaD.

The study identified a statistically significant relationship between the period in which the student is enrolled in the undergraduation course and the fact that he or she is motivated or not to perform disciplines in EaD, going toward the literature on distance learning (Carmo, 2014). According to the results of the final *logit* model of this research, students who are in their first undergraduation year have a lower probability of being motivated to perform one or more disciplines of in-class graduation in EaD than their peers who already are more advanced in the course.

In addition, it was possible to establish that a large part of the students (92%) finds it easy the interaction with technological means. Thus, corroborating the findings of the literature on the influence of the domain of technological tools (Margaryan et al., 2011), the results of the final logistic model of the research identified that the familiarity with the information and communication technologies presents a directly proportional relationship, and statistically significant, with the likelihood of the learner being motivated to perform one or more disciplines of their undergraduate course in the distance learning modality.

The factor related with the flexibility offered by *online* learning modality also proved to be important in explaining the motivation of in-class undergraduation students concerning to attend courses in EaD. This is because, according to the results of the final logistic model, students who, after being disqualified in a compulsory subject, choose to do it for the second time in EaD, have greater motivation concerning attending one or more disciplines of his in-class undergraduation in the distance learning modality (regardless of being disqualified or not), when compared to students who would not, for the second time in EaD, a compulsory subject in which they failed.

Finally, the factor related with the belief that learning in the form of *online* teaching and in-class occur with the same difficulty/ease presented important statistically significant in explaining the likelihood of the learner being motivated or not to perform one or more disciplines in EaD. In this context, according to the results of the final logistic regression model of the study, students who believe that this learning occurs with the same difficulty (or ease) have greater motivation to perform disciplines in EaD.

Although the research has identified that a large part of the learners are motivated to perform one or more disciplines of the in-class undergraduate course in EaD, some characteristics of this type of learning still arouse doubts as to the effectiveness in providing quality education. From the descriptive questions of the data collection instrument, it was possible to identify that some students questioned the support generated by the structure of distance learning, as well as the quality of knowledge to be transmitted.

It should be emphasized that this study has some limitations. The first one refers to the selection of the sample by criteria of accessibility. In addition, the sample was composed exclusively of students from a public Brazilian HEI from the state of Minas Gerais. For future research, it is suggested that the same methodological procedures adopted in this work be employed in samples formed by students from different Brazilian states and from different HEIs, including private ones, so that it is possible to make comparisons between the results achieved.

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