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Federal University of Goiás - *UFG*
Faculty of Administration, Accounting Sciences and
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Post-Graduation Program in Administration

NEAL DORELIS

**TEACHERS' TURNOVER IN BASIC EDUCATION IN THE MUNICIPAL
NETWORK OF GOIANIA**

Goiania - GO
2022



UNIVERSIDADE FEDERAL DE GOIÁS
FACULDADE DE ADMINISTRAÇÃO, CIÊNCIAS CONTÁBEIS E CIÊNCIAS ECONÔMICAS

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NEAL DORELIS

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NETWORK OF GOIANIA**

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ATA DE DEFESA DE DISSERTAÇÃO

Ata nº 23/2022 da sessão de Defesa de Dissertação de Neal Dorelis, que confere o título de Mestre em Administração, na área de concentração em Administração de Organizações.

Aos vinte e três dias do mês de dezembro do ano de dois mil e vinte e dois, a partir das 10 horas, por videoconferência (meet.google.com/oau-mpct-nyd), realizou-se a sessão pública de Defesa de Dissertação intitulada TEACHERS' TURNOVER IN BASIC EDUCATION IN THE MUNICIPAL NETWORK OF GOIANIA. Os trabalhos foram instalados pelo Orientador, Professor Doutor Thiago Alves (PPGADM/UFG), com a participação dos demais membros da Banca Examinadora: Professora Doutora Tatiane Bento da Costa (FACE/UFG), membro titular externo, e Professora Doutora Daniela Rosim (PPGADM/UFG), membro titular interno. Durante a arguição os membros da banca não fizeram sugestão de alteração do título do trabalho. A Banca Examinadora reuniu-se em sessão secreta a fim de concluir o julgamento da Dissertação, tendo sido o candidato aprovado pelos seus membros. Proclamados os resultados pelo Professor Doutor Thiago Alves, Presidente da Banca Examinadora, foram encerrados os trabalhos e, para constar, lavrou-se a presente ata que é assinada pelos Membros da Banca Examinadora, aos vinte e três dias do mês de dezembro do ano de dois mil e vinte e dois.

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DEDICATION

This research work is specially dedicated :

To my Mother:

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To my Sisters and Brothers:

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Education is the most powerful weapon we can use to change the World

Nelson Mandela

LIST OF ACRONYMS

ACEF	: Fundace's Journal of Administration, Accounting and Economics
AIC	: Akaike Information Criterion
APESNOESP	: Association of Teachers of Secondary and Normal Official Education of the São Paulo
BDTD	: Brazilian Digital Librarian of Thesis and Dissertations
BNCC	: Common National Curricular Base
CEB	: Basic Education Chamber
CF	: Brazilian Federal Constitution
CNE	: National Education Council
CONSED	: National Council of Secretaries of Education
DCNEI	: National Curriculum Guidelines for Early Childhood Education
DCNG	: National Curricular for Basic Education
EAD	: Distance Education
EJA	: Youth and Adult Education
FUNDEB	: Fund for Maintenance and Development of Basic Education and Valorization of Education Professionals
FUNDEF	: Fund for Maintenance and Development of Fundamental Education and Valorization of the Teaching Profession
IBGE	: Brazilian Institute of Geography and Statistics
IBM SPSS	: International Business Machines Corporation /Statistical Package for the Social Sciences
IDEB	: Basic Education Development Index
IDH	: Human Development Index
IFSP	: Federal Institute of São Paulo
INEP	: Institut National Etudes et de recherche Pédagogiques
IQGEM	: General index of Municipal Education Quality
IRD	: Indicator of Teacher Regularity
ISQ	: Synthetic Quality Index
LDB	: Laws of the guidelines and bases of education
LDE	: Educational Data Laboratory
MEC	: Ministry of Education and Culture
MELS	: Ministry of Education, Recreation and Sports

NCES	: National Center for Education Statistics
OCDE	: Organization for Economic Cooperation and Development of Education Professionals of Teaching
OIT	: International Organization of Work
PDE	: Education Development Plan
PDE	: Educational Development Program
PERCOS	: School Board Personnel
PPGP	: Public Education Management and Evaluation
RAIS	: Annual Social Informations Report
RJ	: Rio de Janeiro
SAEB	: Basic Education Evaluation System
SCIELO	: Scientific Electronic Library Online
SEED/PR	: Secretary of Education of the State of Paraná
SP	: State of São Paulo
TALIS	: International Survey of Teaching and Learning
UFMT	: Federal University of Mato Grosso
UFPR	: Federal University of Paraná
UNDIME	: National Union of Municipal Education Officers
UNESCO	: United Nations Educational, Scientific and Cultural Organization
USP	: Federal University of São Paulo
VIF	: Inflation Factor Variance

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ABSTRACT

Teachers' Turnover in Basic Education in the Municipal Network of Goiânia

Turnover is a widespread phenomenon in companies and also in the educational system, where it severely hits schools and teachers. With the presence of this phenomenon, schools face challenges to retain their teachers who migrate or leave their professions. When this happens, on the one hand, the teachers are in conditions of instability and leave their schools prematurely because of the needs and objectives that are not met; and on the other hand, it generates a professional brain drain and lack of immediate service in these schools that are forced to recruit new teachers in an unplanned way in order to avoid negative impacts on the training of students. Every time a school is affected, it has direct repercussions on its functioning, in relation to this, this work presents the teachers turnover in the basic public education system. The objective of this work is to examine the phenomenon of the teacher's turnover in the public schools in basic education that are managed by the local government of Goiania. The analysis methodology is quantitative and is based on the technique of descriptive statistics and multiple logistic regression in order to evaluate the predictors, and the data used are of secondary source and come from the Censo Escolar/INEP database of the year 2016 and 2017. The results showed statistically that the rate of teacher turnover in the schools of the city of Goiania was 28,51% (14,78% Movers; 13,73% Leavers); then, the study showed that at the level of the administrative department, the public schools had a rate of 23,17% (14,19% Movers; 8,97% Leavers) in the municipal network. In addition to that, the results of the 3 models proved that predictors were significant and presented the expected effect in the phenomenon. For, these were teachers of all colors and race ($p \leq 0,05$); those aged between 26-35 ($p \leq 0,001$), and having more than 56 years of age ($p \leq 0,05$); those with a permanent contract ($p \leq 0,001$); those who had been linked to a large number of schools, and school networks ($p \leq 0,001$); and those who had worked in CEMEI and in basic education of the final years ($p \leq 0,001$). This highlights that teacher rotation has a significant impact in the context studied. The scientific contribution of the study is based on the originality of the results of the teachers who migrated and left the public schools in the municipal network of Goiania. The study concludes on the importance of the state taking charge of this phenomenon in schools through an innovative educational policy to solve this problem.

Keywords: Teachers' Turnover. Educational Policy. Basic Education

RESUMO

Rotatividade dos Docentes na Educação Básica na Rede Municipal de Goiânia

A rotatividade é um fenômeno generalizado nas empresas e também no sistema educacional onde atinge severamente as escolas e os professores. Com a presença deste fenômeno, as escolas enfrentam desafios na retenção dos professores que migram ou deixam as suas profissões. Quando isto acontece, por um lado, os professores estão em condições de instabilidade e abandonam prematuramente as suas escolas devido a necessidades e objetivos não satisfeitos; por outro lado, gera uma fuga de cérebros profissionais e falta de serviço imediato nas escolas que são obrigadas a recrutar novos professores de uma forma não planejada a fim de evitar impactos negativos na formação dos alunos. Cada vez que uma escola é afetada, tem repercussões diretas no seu funcionamento, em relação ao qual, este trabalho apresenta a rotatividade dos professores no sistema educativo básico público. O objetivo deste trabalho é examinar o fenômeno da rotação de professores nas escolas públicas do ensino básico que são geridas pelo governo local de Goiânia. A metodologia de análise é quantitativa baseada na técnica de estatística descritiva e regressão logística múltipla a fim de avaliar os preditores, e os dados utilizados são de fontes secundárias e vêm do banco de dados Censo Escolar/INEP do ano 2016 e 2017. Os resultados mostraram estatisticamente que a taxa de rotatividade de professores nas escolas da cidade de Goiânia foi de 28,51% (14,78% Migrações; 13,73% Saíram); então, o estudo mostrou que, no nível do departamento administrativo, as escolas públicas tinham uma taxa de 23,17% (14,19% Migrações; 8,97% Saíram) na rede municipal. Além disto, os resultados dos 3 modelos provaram que os preditores eram significativos e apresentaram o efeito esperado no fenômeno. Pois, estes eram professores de todas as cores e raças ($p \leq 0,05$); aqueles com idade entre 26-35 anos ($p \leq 0,001$), e acima de 56 anos ($p \leq 0,05$); aqueles com contrato permanente ($p \leq 0,001$); aqueles que tinham sido ligados a um grande número de escolas e redes escolares ($p \leq 0,001$); e aqueles que tinham trabalhado no CEMEI e na educação básica nos últimos anos ($p \leq 0,001$). Isto destaca que a rotação de professores tem um impacto significativo no contexto estudado. A contribuição científica do estudo se baseia na originalidade dos resultados dos professores que migraram e deixaram as escolas públicas da rede municipal de Goiânia. O estudo conclui que é importante que o Estado se encarregue deste fenômeno nas escolas através de uma política educacional inovadora para resolver este problema.

Palavras chaves: Rotatividade dos Professores. Política Educacional. Educação Básica

RÉSUMÉ

La Rotation des Enseignants dans l'Éducation Basique dans le Réseau Municipal de Goiânia

La rotation est un phénomène répandu dans les entreprises et aussi dans le système éducatif où il frappe sévèrement les écoles et les professeurs. Avec la présence de ce phénomène, les écoles font face à des défis pour retenir leurs professeurs qui migrent ou laissent leurs professions. Quand cela est arrivé, d'une part, les professeurs sont dans des conditions d'instabilité et laissent prématurément leurs écoles à cause de leurs besoins et objectifs qui ne sont pas comblés; et d'autre part, cela génère une fuite cerveau professionnel et d'absence de service immédiat dans ces écoles qui sont obligés de recruter de nouveaux professeurs de manière imprévue afin d'éviter des impacts négatives sur la formation des élèves. Chaque fois qu'une école est touchée, cela a des répercussions directes sur son fonctionnement, par rapport à cela, ce travail présente la rotation des professeurs dans le système public éducatif basique. L'objectif de ce travail est d'examiner le phénomène de la rotation des enseignants dans les écoles publiques de l'éducation basique qui sont gérées par le gouvernement local de Goiânia. La méthodologie d'analyse est quantitative basée sur la technique de la statistique descriptive et la régression logistique multiple afin d'évaluer les prédicteurs, et les données utilisés sont de source secondaire et proviennent de la base de données de Censo Escolar/INEP de l'année 2016 et 2017. Les résultats ont montré statistiquement que le taux de la rotation des professeurs dans les écoles de la ville de Goiânia était de 28,51% (14,78% Migrations; 13,73% Sortants); puis, l'étude a montré qu'au niveau du département administrative, les écoles publiques ont eu un taux de 23,17% (14,19% Migrations; 8,97% Sortants) dans le réseau municipal. En plus de cela, les résultats des 3 modèles ont prouvé que des prédicteurs ont été significatifs et ont présenté l'effet escompté dans le phénomène. Car, ce sont les professeurs de toutes les couleurs et race ($p \leq 0,05$); ceux âgés entre 26-35 ($p \leq 0,001$), et ayant plus de 56 ans ($p \leq 0,05$); ceux ayant un contrat permanent ($p \leq 0,001$); ceux qui ont été lié à un grand nombre d'école, et de réseaux d'écoles ($p \leq 0,001$); et ceux qui ont travaillé dans le CMEI et dans l'éducation fondamentale des années finales ($p \leq 0,001$). Ce qui souligne que la rotation des professeurs a un impact significatif dans le contexte étudié. La contribution scientifique de l'étude se base sur l'originalité des résultats des professeurs qui ont migré et laissé les écoles publiques dans le réseau municipal de Goiânia. L'étude conclut sur l'importance d'une prise en charge de ce phénomène par l'Etat dans les écoles à travers une politique éducative innovante pour résoudre ce problème.

Mots clés : Rotation des Professeurs. Politique Educative. Education Basique

REZIME

Wotasyon Anseyan yo nan Edikasyon Debaz nan Rezo Minisipal Goiania a

Wotasyon se yon fenomèn ki etann li nan antrepriz yo e nan sistèm edikasyonèl yo tou kote lap frape lekòl ak profesè yo sevèman. Avèk prezans fenomèn sa a, lekòl yo ap fè fas ak defi pou kenbe pwofesè kap emigre oswa kite profesyon yo. Lè sa fèt, yon bò, pwofesè yo nan kondisyon enstabilite ki fè yo kite lekòl yo prematireman akòz objektif yo ki pa satisfè; yon lòt bò, sa jenere yon fwit sèvo pwofesyonèl ak mank sèvis imedyat nan lekòl sa yo ki oblije rekrite ankò nouvo pwofesè san atann pou evite enpak negatif sou fòmasyon elèv yo. Chak fwa yon lekòl afekte, li gen konsekans dirèk sou fonksyonan li, nan kontèks sa a, travay sa a prezante wotasyon pwofesè yo nan sistèm piblik edikasyon basik. Objektif travay sa a se egzamine fenomèn wotasyon pwofesè nan lekòl piblik edikasyon debaz yo ki jere pa gouvènman lokal nan Goiânia. Metodoloji analiz la se kantitatif ki baze sou teknik estatistik deskriptif ak regresyon lojistik miltip yo nan objektif pou evalye prediktè yo, e done itilize yo se sous segondè epi yo soti nan baz done Censo Escolar/INEP pou ane 2016 ak 2017 la. Rezilta yo te montre estatistikman ke to wotasyon nan lekòl ki nan vil Goiania yo te 28,51% (14,78% Migrasyon; 13,73% Abandone); ansuit, etid la te montre ke nan depatman administratif la, lekòl piblik yo te gen yon pousantaj de 23,17% (14,19% Migrasyon; 8,97% Abandone) nan rezo minisipal la. Anplis de sa, rezilta yo nan 3 modèl yo te pwouve ke prediktè yo te enpòtan epi prezante efè espere ya sou fenomèn nan. Paske, se te pwofesè tout koulè ak tout ras ($p \leq 0,05$); sa ki gen laj 26-35 ane ($p \leq 0,001$), ak plis pase 56 ane ($p \leq 0,05$); sa ki gen yon kontra pèmanan ($p \leq 0,001$); sa ki te lye ak yon gwo kantite lekòl ak rezo lekòl ($p \leq 0,001$); ak sa ki te travay nan CEMEI, ak edikasyon debaz nan dènye ane yo ($p \leq 0,001$). Sa ki montre ke wotasyon pwofesè yo gen yon enpak enpòtan sou kontèks etid la. Kontribisyon syantifik etid la baze sou orijinalite rezilta pwofesè ki te imigre e ki te kite lekòl piblik yo nan rezo minisipal Goiânia. Etid la konkli ke li enpòtan pou Leta pran an chaj fenomèn sa a nan lekòl atravè yon politik edikasyon inovatè pou rezoud pwoblèm sa a.

Mo kle: Wotasyon Pwofesè yo. Politik Edikativ. Edikasyon Debaz

Introduction

Education is a fundamental social right in the construction of any Nation State as well as the construction of the components of citizenship (Cunha, 2020). When it works badly the country and the citizens suffer, but when it is supervised and supported, the citizens benefit and become useful professionals to participate in the sustainable development of their communities. Education of people allows a periodic movement of development, promoting the improvement of social conditions (Al Tarrara Alves Horsth, 2018). These improvements in social conditions will allow citizens to live well within their communities, as being educated is synonymous with being free and also knowing how to use that freedom. In this sense, education aims at a blossoming of the human personality, a strengthening of human rights and fundamental freedom while promoting understanding, tolerance and friendship among nations, and all racial or religious groups (Silva et al., 2020).

Education is recognized as a fundamental human right, an essential condition for the productivity and well-being of individuals, economic and social development of entire societies (Unesco, 2018). This development must be made by the State in the implementation of all the elements of public policy in a country through a strong educational policy. In 1948, Universal Declaration of Human Rights and the 1966 International Covenant on Economic, Social and Cultural Rights mentions that education should be accessible to all on the basis of individual merit and capacity (Unesco, 2018). In response to the Universal Declaration of Human Rights of the United Nations General Assembly (Un, 1948), the right to education was proclaimed as fundamental for the better conditions of life, justice and equality (Dantas et al., 2020).

In chapters I and II of the Brazilian Constitution, articles 1 to 11 focus on the fundamental principles of the social rights of Brazilian citizens; then, in chapter III in the first section, articles 205 and 206 focus on education as a right for all and a duty of the State; then, article 208 of the same chapter focuses on the valorization of teachers in education in paragraph V (*Constituição*, n.d.). As a social right, education acts on a citizen making a personal development while allowing him to contribute his building stone in the society (Fraga et al., 2019). Conversely, when there are problems to be solved within an educational system, it can impact the learning of citizens, which is bad for the advancement of a community, usually for the development of a country. Because, poor quality of education received has profound consequences in terms of a citizen's attitudes and behaviors (Unesco, 2005). In this sense, education is an important aspect that must be object of debate in order to treat problems that exist in this discipline.

Nowadays in education, we are witnessing a major problem relatively related to school institutions and teachers. It is a symptom in which the rate of teachers varies periodically from one school institution to another or they left the profession altogether. This phenomenon is known as teachers' turnover. It is indeed a harmful situation that is found in several countries and produces shortage of teachers in schools (Carver-Thomas & Darling-Hammond, 2019). Turnover implies a malfunctioning academic system around the world where many countries are not immune to this chaos that plagues the functioning of the basic education system. According to Boe, Cook and Sunderland (2008), teachers' turnover leads to teacher shortages by creating crisis in schools, from which Shen (1997) said that approximately 157,000 teachers leave the profession each year, while another 232,000 are transferred to other school districts in the United States (Chambers Mack et al., 2019).

In the international literature many countries faces this phenomenon, previous research has established that in the United States within five years, 30% of teachers leave the profession, with a turnover rate of about 50,0% in high-poverty urban schools (Cunningham, 2019), in California, the state has invested nearly \$200 million in recent years to recruit, prepare, support, and retain teachers (Linda Darling-Hammond, Leib Sutcher, 2018). Moreover, the annual demand allocation rate to eliminate the teacher deficit has increased from 5,1% in 1992 to 8,4% in 2008, compared with Singapore and Finland, which are typically 3,0% to 4,0% (Carver-Thomas & Darling-Hammond, 2019). In Canada, statistics from the Ministry of Education, Recreation and Sports - MELS (2006) based on the school boards' personnel database-PERCOS show that the problem of the abandonment of beginning teachers is real in Quebec : out of 15% of new teachers hired during the first five years, approximately one teacher on six abandons his career prematurely (Kirsch, 2006).

The issue of teacher attrition affects both developed and countries in development (Kamanzi et al., 2017). The international attrition of teachers results in a shortage of teachers, which increases the overall demand for teachers in the educational labor market. Small changes in the national attrition rate impact teacher labor markets (Carver-Thomas & Darling-Hammond, 2019). For, teacher turnover creates high costs in terms of recruiting, replacing, and training new teachers in the school community. In the United States, turnover costs about \$7 billion per year to replace departing teachers (Chambers Mack et al., 2019).

In the national research in Brazil, basic education is also confronted with this phenomenon of teachers' turnover and generates problems (Rojo & Minier, 2016). This phenomenon affects about one third of basic education institutions, 32,6% in the country (Pereira Junior & Oliveira, 2016). In addition, a survey revealed during the years 2012 and 2013 that 11,9% of teachers are considering stopping working in teaching, 20,0% changing profession and 28,2% retiring (Pereira Junior & Oliveira, 2016). Data published in a systemic assessment of occupations in Brazil (2014) that was carried out by the Intersyndical Department of Statistics and Socio-Economic Studies in partnership with the Ministry of Labor and Employment showed that the turnover rate of formal jobs in the education sector was 31,4% in 2012 (Frantz, 2018).

Pereira Junior and Oliveira (2016) described the teachers' turnover in basic education and showed its average incidence that revolved around 54%, while taking into account its components related to migration, retirement or abandonment of the profession, then, there was the possibility of calculating the coefficient of variation related to this phenomenon in relation to these data that are 61,1%, which means that its occurrence occurs before important dispersion in basic schools in Brazil (Frantz, 2018). Faced with this phenomenon, school is in a critical situation, and unable to offer quality education to children (Muramoto, 2020). Indeed, given this reality that ravages education and impacts schools, it is essential to work on this and ask these questions: What is the rate of teachers' turnover? and What are the explanatory factors of the teacher's turnover in the profession?

In relation to this phenomenon, the review was made in the literature and saw that some authors have addressed this problem, and the national and international literature studies relate the importance to this subject and to considerable discussion. Firstly, Edmilson Antonio Pereira Junior and Dalila Andrade Oliveira addressed it and said that it is a phenomenon that occurs regularly in Brazil in basic education institutions (Pereira Junior & Oliveira, 2016). They showed that public schools have difficulties in retaining their teachers, which is considered an impact for the good performance of academic programs that should reach the schools (Pereira Junior & Oliveira, 2016). Secondly, Carver-Thomas and Darling Hammond also addressed this problem by speaking on the state of teacher attrition and mobility by saying that teacher turnover has contributed to the problem of school personnel. They said that even though there are teachers available to meet the overall demand, turnover can contribute to labor market imbalances and brings negative consequences on schools and the quality of student learning (Carver-Thomas & Darling-Hammond, 2019).

Thirdly, Frantz Maíra (2018) also analyzed the incidence of this phenomenon in basic education in public schools in Curitiba, Brazil, measuring with an indicator whose unit of analysis of explanatory factors in school that affect the working conditions of teachers, and concluded that teacher turnover (22,2%) significantly affects the context studied. In the network municipality of Curitiba, the analyses on the explanatory factors showed that the indicators are determinant to explain its incidence and also revealed a large magnitude (Frantz, 2018).

Literary reviews have shown a set of problems, however, there are some aspects especially in national literature, that have not been taken into account. In relation to this, the indicators proposed by the authors do not take into account those who migrate in the profession (Pereira Junior & Oliveira, 2016). Then, the work did not produce reports on teachers regarding student behavior and tasks interfering with teaching (Carver-Thomas & Darling-Hammond, 2019).

This study is justified by providing information on the phenomenon of teacher turnover in Brazil. Generally, there are some studies that have been done on turnover in Brazil, but in the network municipality of Goiania, there is not one that analyze the leavers and movers' teachers' problem simultaneously. In relation to this, this study provides these new insights as contribution that will allow the managers of the network municipality of Goiania to apply an educational public policy and to take decisions in the State to solve this problem so that they can stabilize themselves by continuing to instill intellectual knowledge to students, because a known problem is half solved.

The valorization of teachers in basic education is important, because they are the ones who take care of it and educate the citizens, and they also carry out principles and actions that guide and give meaning to education while building the human person in its multiple dimensions (Fucks & Madalena, 2020). The maintenance of a stable basic education is important, and it must be done by valuing and retaining teachers to ensure that they stabilize in order to continue to provide all schools with knowledge, which would allow them to have a career with long experience to serve the community effectively (Carver-Thomas & Darling-Hammond, 2019).

In the general context, education is the most coextensive function to the fabric of humanity, in that sense, the teaching profession should be treated well and at the first level (Avanço, 2020). Taking care of these valuable teachers will generally allow the schools to function well, especially the public basic education institutions.

After seen the different facts related to this phenomenon, it is important to formulate the objectives in order to proceed with a methodical approach to achieve them. In order to elucidate this problem, the general objective of this work is to examine the phenomenon of teachers' turnover in public schools of basic education managed by local government of Goiania. There are two specific objectives:

- a) To know the turnover rate of teachers who migrate and leave the schools;
- b) To identify the factors that explain teachers' turnover in the profession.

It is important to know the turnover rate of teachers who have migrated and left the profession and the factors associated with it. A teacher who migrates in education is the one who leaves the school where he/she works, to go work in another school that can be public or private. Then, the case of a teacher who leaves the school can be varied, it can be, either can temporary, or definitive. In the temporary case, the teacher can change position and stay in the same school, or, he can leave the school where he works to go to study, or for health reasons; in the permanent case, the teacher makes the retirement or definitive abandonment of the educational system.

The strength of education in a country is the ability to reinforce the training provided by teachers while supporting them in seeking to resolve existing academic problems for the maintenance of a good academic structure. In addition to this, teachers are one of the biggest actors in the educational system is the teacher, so take care of them will solve many problems that the educational system faces. In a country, when education is one of the priorities, it allows the valorization of all the educational actors, since they contribute in the advancement of a country.

This research work is useful for Brazilian society as a whole, as well as for the public education community. The study has contributed to know the general percentage of teacher turnover, as well as those who migrate and leave the profession in the municipal network of Goiânia, so that a public education policy could be made in their favor by the local state authorities. Because, at the time this work is being realized, there is no study that has been made from this moment for the public schools of basic education in the municipal network of Goiania on this subject.

The study is composed of four themed chapters, in this sense, the study presents the theoretical approach that is empirical; then, the methodological chapter; and, the results and discussions; finally, the final consideration has been presented in order to establish the architecture of the dissertation.

1. Theoretical Approach

A research area often refers to a discipline and can have a psychological, sociological, economic, historical, pedagogical, didactic orientation, etc., hence the usefulness, scope and objective in a research work is to consult theoretically the most recent documents. In relation to the elements on which this phenomenon is based, we have presented the theoretical foundation in four parts through an empirical approach: in the first part we have presented teachers in basic education in Brazil; secondly, the teachers' turnover and its different aspects; thirdly, we showed why it is important studying this phenomenon; and lastly, we have presented some studies that have been done on this phenomenon in Brazil.

1.1 Teachers in Basic Education in Brazil

In order to understand the phenomenon of turnover, it is appropriate to take a look at the professional evolution of teachers in basic education. For this purpose, this subsection is devoted to the presentation of the teachers in order to better understand the way in which they have been integrated in the profession, and also to see the issue of training and recruitment, meanwhile presenting the laws that have been created and legally amended during several different periods passed with the aim of protecting them in basic education.

The figure of the teacher (master or maître in french) has fascinated Western thinkers since the time of Platon, because, the master was the one who prepares the advent of knowledge and introduces his disciple to new forms of life to form future generations, not only Platon, but also Rousseau, Nietzsche, Rabelais, Dewey, Piaget, Freire, Montessori, etc., have all formulated fascinating representations of the master (Schwimmer, 2013). Therefore, the teacher by his ability to prepare the advent of knowledge for citizens, has a societal function. So, the definition of the function of teacher is understood in the daily exercise of the profession in schools, social and professional life (Machado & Lucas, 2017).

Teachers are actors responsible for the growth of the educational system, generally contributing to its smooth running and to the learning of students (Ridge & Lavigne, 2020). They provide knowledge to citizens at all ages, from kindergarten to adolescence at the basic education level and also to more mature citizens in universities in order to lead them to a professional level in their life. They constitute the third largest professional subgroup in Brazil with about two million teachers to serve 51 million students in elementary school, 80% of them in the public sector (Barretto, 2015). According to Ribeiro and Smeha (2009), the teacher seeks professional recognition in the face of their contribution in the education of students, not a life

full of responsibilities and burdens facing obstacles throughout the year, but they are often undervalued throughout their career (Machado & Lucas, 2017). Now, let's present the teacher training process in the Brazilian basic education system.

The training of teachers to work in basic education in Brazil is done in the higher level, in a curriculum, a full degree in universities and institutes of higher education, admitted as minimum training for the exercise of their profession in early childhood education in the first five years, and then offered at the fundamental and middle level in the normal modality (Wording given by Law No. 12796, of 2013). Taking into account articles 61 and 62 of law 9394/96, we observed that the specific training of teachers in legally recognized courses is a key factor for the exercise of the teaching function. In other words, to be a teacher it is not enough to identify oneself in the profession, for example, it is necessary to study and be qualified with a minimum of education as required by law. Thus, the technical and pedagogical preparation is only possible with an adequate training (Adalgisa Bedim et al., n.d.).

In the process of teacher training in Brazil, the microdata from Census of Higher Education /INEP¹ from 2000 to 2015 shows that there was a diversity of designations for the courses associated with education, especially the courses that allow to the teachers to teach in the first years of school of primary in basic education. Aggregations had to be made by Census of Higher Education to facilitate data analysis by taking into account the curricula associated with teacher education. Considering this aspect, three groups were formed in bac : Pedagogy and Related, Traditional Licenses and Professional Licenses, in of these three groups, the first two are based on basic education in Brazil (Mandarino & Beltrão, 2018).

The first group, Pedagogy and Related, aims to train those who work in early childhood education and the first years of basic education; the second group, Traditional Licenses, aims to train teachers for the last years of basic education and for secondary education in Brazil (Mandarino & Beltrão, 2018). From 2000 to 2015, the evolution of the number of courses, enrollments and graduates with breakdowns by modality of teaching in class, distance, and administrative category is presented through data on undergraduate degrees of group one² and two³ (Mandarino & Beltrão, 2018).

¹ Available on website: <http://portal.inep.gov.br/web/guest/sinopses-estatisticas-da-educacao-superior>

² Pedagogy and Related

³ Traditional undergraduate degrees

It should be noted that of the total courses recorded in 2011 census of higher education, 26,0% of them were intended to train teachers for basic education; and the courses in administration was in first place with an enrollment of 2,279, then comes the offer of courses in pedagogy with an enrollment of 1,801 which was the second largest in the country among the degrees (Barretto, 2015).

Still on the subject of the level of academic training of teachers, the academic and pedagogical data of the MEC and Censo Escolar/INEP (2020) also evaluated the training of these teachers in the Brazilian basic education system based on the number of teachers who were assigned to the schools showed that:

- a. in early childhood education, 79,1% have completed higher education (76,5% with a degree and 2,6% with a bachelor's degree) and 14,3% have a standard high school/teacher's degree. We also identified 6,6% with a middle or lower level;
- b. the first years of basic education have 85,3 percent with higher education (81,8 percent with a bachelor's degree and 3,5 percent with a bachelor's degree) and 10 percent with regular secondary education/teaching ;
- c. In the final years of primary education, 91,8% of teachers completed higher education (87,9% with a degree and 3,9% with a bachelor's degree). The percentage of teachers with an undergraduate degree increased between 2016 and 2020;
- d. then, among the teachers who work in secondary education, 97,1% have a higher education degree (89,6% in higher education) and 7,4% have a bachelor's degree) and 2,9% have a secondary education degree or less (MEC & INEP, 2021).

After reviewing the teacher training process in the Brazilian educational system, it is important to make an overview of the recruitment process of these teachers.

For the recruitment process, with a nod to the history of recruitment in basic education, since 1931 a register is opened at the Brazilian Ministry of National Education for each teacher in secondary education to verify the requirement of specialized university degrees (Vicentini, 2003). This was with the purpose of improving the status of public sector teachers in Rio de Janeiro after verification for legal operation so that they could present a teaching license in the profession (Vicentini, 2003). During the 1940 and from the beginning of 1960, secondary school teachers in Brazil asserted themselves as a representative element of the profession, highlighting the specificities of their personal status in a moment of expansion of this level of education (Vicentini, 2003).

Nowadays, in the Constitution, laws have been elaborated in their regard in Chapter III, Section I of the CF / 88 which speaks of the treatment of teachers in education in the fifth point of Article 206. The valuation of teachers is guaranteed by law, a career plan for the public teaching profession with a flat professional salary and income exclusively through public competition of tests and diplomas (*Constituição RFB*, n.d.). As for Article V and VIII especially, they are labels given from the wording of the constitutional amendment no. 53 of 2006 and no.108 of 2020 that promote the valorization of teachers by stating the following:

- V - Valuing school education professionals, guaranteeing, in the form of the law, career plans, with entry exclusively through public competition of tests and titles, for public networks;
- VI - Democratic management of public education, according to the law;
- VII - Guarantee of quality standards;
- VIII - National professional salary floor for public school education professionals, under the terms of federal law;
- IX - Guarantee of the right to education and lifelong learning. The law shall provide for the categories of workers considered to be professionals in basic education and for the establishment of a deadline for the preparation or adaptation of their career plans, at the level of the Union, the States, the Federal District, and the Municipalities (*Constituição RFB*, n.d.).

According to these amended laws, education professionals in Brazil must have an exemplary educational background by joining the public school through admission test, while having a good career plan and reasonable salary. This treatment must favor a fair salary floor corresponding to their qualifications and professional skills, as well as better working conditions to be able to continue forming citizens (*Constituição*, n.d.).

Still on the subject of the teacher recruitment process, according to MEC and INEP (2021), there were 2,189,005 teachers registered in the Brazilian basic education system in 2020, and most of them worked in primary education (63%), where they were evaluated at a total of 1,378,812 teachers (MEC & INEP, 2021). In fact, there were approximately 47,3 million students in the Brazilian educational system in 2020; and of this number in basic education, at the level of kindergarten, primary and secondary schools, this number was estimated at 179,5 thousand students registered in schools (MEC & INEP, 2021).

Then, the academic and pedagogical data of the MEC and Censo Escolar/INEP of 2020 showed that from the 2,189,005 teachers that the Brazilian basic education system contained: the Brazilian preschool education had 593,000 teachers, composed of 96,4% women and 3,6% men; then, there were 1,378,812 teachers in elementary education; then, the first years of elementary school had 748,000 teachers working, which was distributed has 88,1% are women and 11,9% men ; to continue, in the later years of primary education, 753,000 teachers worked,

and they are composed of 66,8% women and 33,2% men; finally, a total of 505,782 teachers served in secondary education in 2020 which were composed of 57,8% women and 42,2% men (MEC & INEP, 2021).

Regarding the recruitment process of teachers as shown in Figure 1 below, BERG and FELICIA (2015) described eight fundamental aspects to evaluate the conditions of a good recruitment of a school institution that has needs in teaching staff (Berg & Felicia, 2015), in relation to this, this figure presents the different aspects that must exist for there to be harmony between these different academic actors for the smooth running of the educational system, because all actors have their role to play in facilitating a good process of recruitment and stabilization of teachers.

FIGURE 1 – Fundamental Criteria for a Good Recruitment of Professors in Schools



Source: Developed by the author based on data from EBERG e FELICIA, 2015, p. 12. / Recruiting expert teachers in high-needs schools: leadership, money and colleagues. / EpaA Aape. Education Policy Analysis, 23(9), 1–23

Frame 1 below is based on the criteria for good teacher recruitment, and has shown that there needs to be harmony between these different aspects for the smooth running of an education system, and all the actors within it, as each has their role to play in facilitating the smooth running of schools and stabilizing teachers.

FRAME 1 – Fundamental Criteria for a Good Recruitment of Professors in Schools

No	Aspects	Characteristics
1	Salary	There needs to be potential for future salary growth and monetary incentives associated with the distinction of being a highly qualified teacher, and then benefits such as health insurance, sick leave for example.
2	Community	This refers to the environment and school safety, i.e., the neighborhood in which the school is located given its proximity to home and how the community supports the students.
3	School	This refers to class size and access to material/technology resources, as well as a reasonable teaching assignment and guaranteed preparation time during the school day.
4	Administration	This is consistent with the principal's professionalism and vision for the school; secondly, the mutual respect between the principal/teachers/support staff; thirdly, the principal's helpful comments regarding instruction.
5	Teacher Professionalism	Relies on how teachers' voices are heard in school decision making and commitment to the goals to be achieved in the profession while having knowledge to effectively teach in their areas of higher order skills and critical thinking during lesson time within state standards; they have the opportunity to take on leadership roles by collaborating, mentoring, observing, and reviewing the teaching of other teachers, having control over what happens in the classroom, while engaging in professional development activities within the school; they set realistic standards for their students, engaging in their learning, while believing that they can learn with some appreciation of the classroom, the cultural diversities of students and their families, with this, teachers will be recognized for their good work, and they will learn from their own practice.
6	Students	The student's behavior must be exemplary, even if they have different ethnic and socio-economic backgrounds; the support, the level of motivation of the students and the way discipline issues are handled, then the involvement of the parents is important.
7	Students' results	This refers to the importance teachers place on standardized tests of the results of the students, the extent to which the results of those tests are used to evaluate teachers and make data-driven decisions, and then the state's label for the school based on those test results.
8	Caring	This is consistent with how the Director cares about the teachers, support staff, and students in the school.

Source: Developed by the author based on data from EBERG e FELICIA, 2015, p. 12. / Recruiting expert teachers in high-needs schools: leadership, money and colleagues. / Epa Aape. Education Policy Analysis, 23(9), 1–23

Thus, despite the level of teacher training and the recruitment process in the education system, along with the laws that are available to support teachers, there are some who are dissatisfied with the way they are treated, and are forced to rotate in basic education to other schools in order to solve their problems. To better understand the problem of teachers in schools, we introduced the concept of teachers' turnover in section 1.2.

1.2 Teachers' Turnover

Teachers' turnover is a phenomenon that has been raging for some time in the educational system, both basic and higher levels education. With the appearance of this phenomenon, schools continue to lose one of their valuable actors in the educational system, which are the teachers. We know that teachers are artists of knowledge whose mission is to transmit knowledge to the present generations (citizens), which will be useful in the future for the societies in which they evolve. In order to better address this concept, this section is divided into two sub-sections: the first dealt with the concept of teacher turnover analyzed in our literature review, and the second presented some of the main aspects of this phenomenon. In short, the subsections below present the concepts related to this problem in basic education, which is the concept of teacher turnover, along with some basic aspects.

1.2.1 What is Turnover?

The definition of the concept of turnover in education refers to the impermanence of teachers in schools and this is manifested in several countries producing teacher shortages in schools (Carver-Thomas & Darling-Hammond, 2019), and the shortage of teachers in recent decades has been a major problem (Richard Ingersoll & Henry May, 2019).

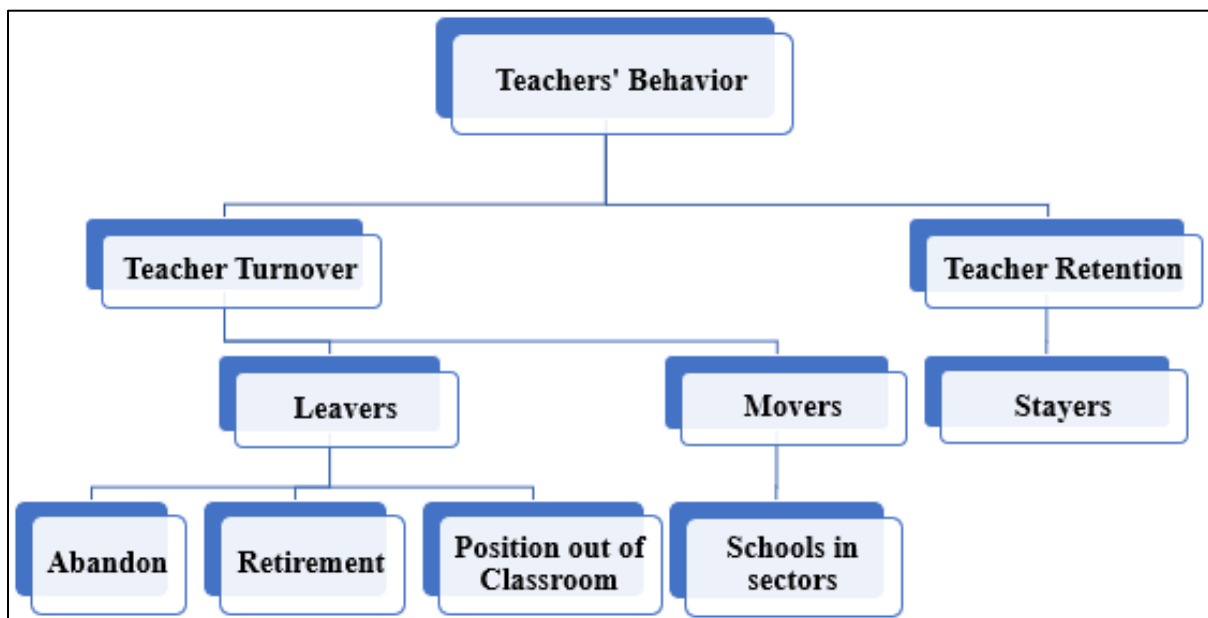
In a general context, Ingersoll (2011); Ingersoll and Merrill (2012) say that turnover shows the mobility of teachers between schools called mobility-related turnover, or the total reduction of teachers in the profession, called decline-related turnover (Özoğlu, 2015). Thus, there is a change on the number of teachers from one year to the next in a given school setting (Sorensen & Ladd, 2020). When we talk about teacher turnover, it refers to movers within the same district or to different district, then, movers without district i.e. those who left definitively the profession (Gary Barnes & Edward Crowe, 2007).

The higher the turnover is, the greater is the shortage of qualified teachers missing to offer their services for available jobs at prevailing conditions and salaries (Darling-Hammond & Podolsky, 2019). This lack of new teachers also has an impact on the size of student enrollment in the schools (Sutcher et al., 2019). High turnover in schools reduces student achievement while preventing the efficiencies that can accompany teacher experience. Turnover corresponds to a negative disengagement of teachers on their roles and tasks, and as a result they display a behavior and attitude of rejection of their profession, all of this, is in relation to the bad treatment suffered at the hand of schools officials (Kamanzi et al., 2017). As for the aspects, let us see some in this phenomenon.

Ingersoll and Smith (2003) presented the behavior of teachers on some aspects of this phenomenon, the first aspect shows that teachers stay in the profession to perform their activities (retention) which is considered positive; the second aspect deals with the issue of migration, departure and retirement in the profession (turnover) which is considered negative. As for the migration issue in the second aspect, the authors show that teachers stay in the profession, but change schools from one district to another (Bauer et al., 2017).

Caring of teachers means limiting the damage in terms of the quality of training they give to students, in order to ensure their stability in schools. As a result, figure 2 logically shows the modeling of the two-way phenomenon on teachers' behavior that identifies the retention and turnover of teaching in basic education. This phenomenon has harmful effects in the educational system.

FIGURE 2 – Modeling Teachers' Behavior during the Turnover Phenomenon in Basic Education



Source: Prepared by the author (2022)

When speaking of turnover, we are referring to leavers or movers' teachers. In this sense, the migration of a teacher is seen in the educational system as a way in which a teacher leaves a school in which he/she works to go to another school that can be either public or private within the same municipality where the school where the teacher was working is located, or in another municipality. It should be mentioned that in different countries these same reasons are identified as fundamental in the teachers' turnover, namely, salary, working conditions and personal motivation.

Then, regarding the case of the teachers leaving the schools, it depends on the case, and it is varied because of the reason of the teacher leaving. This case can be either temporary or permanent. When the reason for the teacher's departure is temporary, the teacher changes position but remains in the same school where he/she used to teach, or, the teacher can leave the school to study, or it can also happen for health reasons. In the case of permanent departure, the teacher retires or leaves the educational system to work in another job that is not academic.

The turnover has a disruptive organizational influence, and all members of a community suffering from this school problem are vulnerable, including the remaining teachers and the students (Ronfeldt et al., 2013). According to Biondi and Felício (2007), a correlation between teacher turnover and student performance in grade 4 elementary education in the Basic Education Assessment (SAEB) said:

It is observed that classes that had the discipline of mathematics throughout the school year with the same teacher, i.e., that did not have a teacher turnover problem, lead to the best average performance in school. Classes that had only one math teacher during the school year perform 4.2 points better than classes that had more than one math teacher, demonstrating that reducing teacher turnover in classrooms can be the target of policies to improve student performance and educational quality (Bauer et al., 2017, p. 958).

Caring of teachers means limiting the damage in terms of the quality of training they give to students, in order to ensure their stability in schools. As a result, figure 2 logically shows the modeling of the two-way phenomenon on teachers' behavior that identifies the retention and turnover of teaching in basic education. This phenomenon has harmful effects in the educational system.

Therefore, the teachers turnover is harmful to student learning from the absence of cohesive team building in schools, and, on the relationship between schools with families by negatively interfering with the quality of education offered to the population (Cassettari et al., 2014). This opposite phenomenon affects schools and prevents them from forming tomorrow's citizens in order to be useful to society. In this sense, this phenomenon must be studied in the educational system, because it does not only affect the teachers, but also the students, which means that the dropout of the students is also known as a reality and a major problem in the Brazilian education (Silva Filho & Araújo, 2017). Taking charge of teachers means limiting the damage in terms of the quality of education they give to students, in order to ensure their stability in the schools.

1.2.2 Some Main Aspects of Turnover

The phenomenon of turnover occurs to varying degrees, and there are several structural aspects, as, they are at least partly a result of the context of the school system (Kamanzi et al., 2017). These aspects partly cause the teacher shortages that have occurred frequently since at least the 1930 in the United States, and partly the result of inadequate funding in underfunded schools that offer low salaries and poor working conditions binds to this effect (Darling-Hammond & Podolsky, 2019).

Brazil is in third place with the highest turnover rate among the 100 countries with the highest population the countries with the highest IDH (Silva Filho & Araújo, 2017). In the Brazilian context, it is a recurring phenomenon that exist in basic schools where teachers change schools for reasons that are personal or professional (Pereira Junior & Oliveira, 2016). In this sense, some Brazilian schools are facing an insufficient quantity of qualified people ready to offer their services for the available jobs at the current wages and conditions. The reasons for the Brazilian turnover teachers are numerous among which we can mention: school management decision (reduction of teacher's staff, school closing, departure); dissatisfaction (with career, with school, for better pay or benefits); personal (change of residence, pregnancy, health, personal or family reason); looking for another job (pursue another career, take courses to improve opportunities in another professional field); and retirement (Pereira Junior & Oliveira, 2016, p.316).

In the context of this work, for reasons of delimitation of the fields of knowledge, we have retained the issue of migration, retirement and voluntary departure of teachers.

1.2.2.1 Teachers' Migration

To understand better this phenomenon, we need to look at some basic aspects, and one of these in teacher turnover is intra-district and extra-district migration. So, we are going to present them with some basic causes, in order to better address the issue.

Migration is when a teacher moves to another institution, which is done by intra-district or inter-district. First, intra-district migration informs us that the teacher who worked in one school in the first year, happens to choose to work in another school in the same district in the second year, making him a mover within that same district (Gary Barnes & Edward Crowe, 2007). Second, as for out-of-district migration, it is when the teacher was still employed at one school in year 1, and made the choice to work at another school in a different district in year 2,

this amounts to an inter district move (Gary Barnes & Edward Crowe, 2007). In both senses migration does not contribute to overall shortages from a systemic perspective, but their services impact the organization (Darling-Hammond & Podolsky, 2019). In other aspect, sometimes teachers stay in school, but abandon the classroom for occupy other academic positions into this same school, for example school's principal.

Most of the time, the reason for this migration, teachers are looking for a better living condition to support themselves and their families. The issue of remuneration is a cause of this, because many countries have too low remuneration for teachers to have a decent standard of living (Unesco, 2005). In this perspective, remuneration is a fundamental aspect of any profession, mainly in a capitalist society, and it is no different when it is in teaching in the context of the current Brazilian educational system (Alves & Pinto, 2011).

According to Nunes and Pires (2014), the issue of remuneration for Brazilian basic education teachers in public schools has been a recurring theme in academic research over the last twenty years in the country (Pereira, 2016). Therefore, economic satisfaction plays an important role and cannot be underestimated in the lives of teachers (De Almeida Araújo et al., 2020). Salary is one of the various other important reasons for teachers not to migrate into teaching and at the same time making the profession more attractive especially when there is a policy of better salaries (De Almeida Araújo et al., 2020).

In the Brazilian constitution, taking into account the FUNDEF law and the LDB/96, the National Council of Education, House of Basic Education (CNE/CEB) approved resolution no 3 that establishes the national guidelines for career plans and compensation for basic education teachers and opinion no.10 that deals with the guidelines for new career plans and compensation for state, federal district, and municipal teachers (Jacomini and al., 2020).

FUNDEF was only temporarily applied in the period from 1997 to 2006 education (Pont & Montt, 2016). Under Law 11494/2007 and Decree 6253/2007, FUNDEF has been reformed by FUNDEB with the aim of redistributing funds more equitably to the education system, based on the number of students per educational level, and it introduced different spending floors based on specific student populations, such as indigenous communities, youth and adult education (Pont & Montt, 2016).

In the Brazilian constitution, the chapter I of the general provisions section of law no. 14.113 of December 25, 2020, also regulates funds for the maintenance and development of FUNDEB in its articles 1 and 2 permanently in the educational system (*Constituição*, n.d.). These laws emphasize that States, the Federal district and the municipalities should have a new career and remuneration plan in education within six months of the validity of the above-

mentioned law. The career plans are considered a way to value teachers in teaching (Jacomini et al., 2020). According to Morduchowicz (2003), teachers leave the classroom in the educational system to fulfill other roles in search of better working conditions and remuneration:

In general, the current structure [of the teaching career] eliminates well-defined jobs, without providing mechanisms for promotion within the same position [...] In effect, this implies that the professional teaching career does not provide opportunities for those who want to achieve professional distinction, with corresponding salary recognition, without leaving your curricular activities for an administrative, managerial, or supervisory position. This can happen even in cases where the teacher wants to stay in the classroom, where they may feel more comfortable and, in a role, they see as the job they have prepared for. This is clearly a case that benefits neither the teacher nor the education sector and, therefore, society as well (Cassettari et al., 2014, p. 913).

Despite the presence of these laws chronologically presented the paragraphs above to support the teachers, there is still dissatisfaction with the salary level, and these problems involve migration movements. The difficulties related to teacher remuneration in Brazil are confirmed by a report of Education at a Glance 2015: OECD⁴ Indicators (2015), showing that the average starting salary of Brazilian preschool teachers is half that of other countries studied (Pereira, 2016). Low-level pedagogical remuneration is one of the facts influencing teachers' decision to migrate and leave school (De Almeida Araújo and al., 2020).

Teachers who earn a high level of their district salary schedule have an expected turnover rate 31% lower than those whose maximum district salary was lower (Vicentini, 2003). Thus, in reference to the national minimum wage, the basic education teacher is in a better situation than workers who earn a minimum wage, however, what is necessary to meet the vital needs as defined in the Constitution and calculated by Dieese, the fundamental constitutional right of teachers is not respected (Jacomini et al., 2016a). Frame 2 gives a view of the average income of teachers in basic education of those with only one occupation across Federal, State, Municipal, and Private institutions at the regional level and domicile status (Matijascic, 2017).

⁴ Created in 1960 and based at the Château de la Muette in Paris, it brings together the fifteen members of the European Union, to which three Third World countries were added between 1994 and 1996; Mexico, which forms ALENA with its two northern neighbors, and South Korea; then, in 1995, three countries from the former Soviet bloc were added: the Czech Republic, Poland and Hungary; then, in 2000, the Slovak Republic became the thirtieth member

FRAME 2 - Total Income of Basic Education Teachers with a Single Occupation by Region and Residence Status, Brazil – 2015 (In R\$)

Region and Place of Domicile		Federal	State	Municipal	Private
North	Metropolitan	5,806	3,535	2,771	1,161
	Urban non-Metropolitan	3,372	2,665	1,990	1,787
	Rural	-	2,148	1,694	1,860
Northeast	Metropolitan	6,121	2,769	2,139	1,406
	Urban non-Metropolitan	5,065	2,296	1,632	1,133
	Rural	-	1,134	1,255	619
Southeast	Metropolitan	3,646	2,205	2,615	2,504
	Urban non-Metropolitan	4,148	1,990	1,928	1,845
	Rural	-	1,490	1,390	3,039
South	Metropolitan	-	2,811	2,352	1,894
	Urban non-Metropolitan	5,101	2,873	2,054	2,043
	Rural	-	1,938	1,735	1,500
Midwest	Metropolitan	3,500	5,216	3,375	2,406
	Urban non-Metropolitan	4,925	2,665	2,373	1,756
	Rural	-	1,854	1,986	320
Brasil	Metropolitano	5,009	2,852	2,492	2,204
	Urban non-Metropolitan	4,571	2,426	1,894	1,650
	Rural	-	1,632	1,433	1,261

Source: Matijascic, 2017, p.28, based on Pesquisa Nacional por Amostra de Domicílios / IBGE 2015 https://www.ipea.gov.br/portal/images/stories/PDFs/TDs/td_2304.pdf

Comparing the salaries of Brazilian teachers with other professionals in the labor market, those of teachers are the lowest. Andreza Barbosa (2014), concluded that Brazilian basic education teachers earn poorly compared to professionals with equivalent training (Jacomini andc al., 2016). Limarino (2005) also did an analysis of salary per hour worked on Brazilian teachers and mentioned that they earn poorly even compared to some professions that require high school education (Jacomini et al., 2016).

In addition to this, data from OECD countries show that the salary of primary school teachers is only 81,0%, and that of secondary school teachers 85,0%, of that of full-time workers aged 24-64 who graduate (Stromquist, 2018). The current salary of teachers is not fair and does not allow for a dignified life, and this forces them to work double through migration, or even triple, which leads to a loss of energy that hinders their effectiveness (Akkari & Pompeu, 2009). Therefore, faced with this problem, many teachers migrate to other schools within the same or different district in order to have access to a better working condition. When trying and does not work as they expected, they often resort to retirement.

1.2.2.2 *The Retirement*

To begin with the concept of retirement, historically in the period of its appearance Fontoura, Doll and Oliviera (2015) mentioned that retirement was introduced in the late nineteenth century in industrialized countries as a way to provide for older workers in their last years of life ; However, few of them reached the required age of 70 years before retiring, since then the situation has changed in several respects; in addition with the life expectancy that has increased, the recognition of retirement that was considered an alms and right to the worker in that time is no longer the case for the old and the sick (Machado & Lucas, 2017).

According to Soares (2002), the person who retires is inactive and faces losses that cause conflicts with his work capacity and taxation determined by society, and this conflict is repeated at home, because he begins to stay longer in this condition and play the roles of father, husband and grandfather, which was not the case before due to his work and family support obligations (Machado & Lucas, 2017). Retirement is considered a transitional event in the life course and one that brings about changes not only in roles and social status, but also in the individual's conception of life of himself and the world (Bragança, 2004).

Retirement is one aspect in the phenomenon of teachers' turnover with the end of professional activities of teachers in schools, and free time becomes a challenge, because, its concerns are now oriented to feel useful and active, which can affect his quality of life and all its dynamics. In the United States within the same State, Locality, Labor market, Licensing and retirement system, the extent of teacher turnover varies across the school population, 45% of total public school teacher turnover between 2004 and 2005 occurred in one quarter of the public-school population (Ingersoll & May, 2012).

Retirement is not a bad thing in itself, but it depends how it has been done by the teacher. This work is not against the fact that a teacher retires from school, but approaches it in the sense that it occurs before the normal teacher's age required by law which is a premature retirement that implies a drop in the school workforce. According to Fouquereau (2001); Pitaud & Vercauteren (1987), premature retirements have three levels of impact: first, direct consequences on the financing of social security; second, consequences where firms involve a loss of professional skills and a brain drain due to the early departure of skilled workers; last, impact on the older workers who remain who will work much more (Hansez et al., 2005).

There are many factors that can motivate a worker to retire in a job before the legal age, among them, the personal and workplace factor is prevailing. According to Kosloski, Ekerdt and De Viney (2001); Prothero and Beach (1984), these factors must be related to the recognition and valuing of the profession (Hansez et al., 2005). It's a reality that many teachers feel dissatisfied with the different treatments of academic directors in the workplace, which is considered a lack of administrative support (Podolsky et al., 2019). Yet, administrative support refers to the extent to which principals facilitate teachers' work and help them improve their teaching in the workplace (Boyd et al., 2011).

School directors are responsible of the management the school institution, to the verification of the quality of the training that teachers provide to students and to watch over the behavior between students, and teacher-student relationships. Lack of administrative support leads to premature departure from the workplace of teachers who become susceptible to retirement, migration, or leaving schools when they are not in agreement with responsible of school's administration. Teachers have placed so much emphasis on the quality of interpersonal relationships in the workplace (Lapo & Bueno, 2003). According to Carneiro (2001), the lack of dialogue between teachers and the administration is a reality (De Souza & Leite, 2011). As a result, the lack of support from academic staff to work as a team and support the teacher in a school can erode relational trust.

In other aspects, it is difficult to establish a trust relationship between new and old teachers and between new teachers and active students when schools are constantly recruiting new teachers after premature departures, because the old teachers and students are always dealing with strangers in terms of human relations, people with whom they have no experience (Guin, 2004). With these constant changes, schools are particularly vulnerable to the negative impacts of retirement and turnover, as it disrupts the organizational structure and team functioning of a school. On the other hand, the issue of teacher retirement is also based on the working conditions that are of great importance in the effective work of the teacher (Vieira & Vaillant, 2017). Now, the working conditions correspond to everything that interfaces in the service delivery in a job, whether it is the schedule, the place, the social benefits and the atmosphere and other aspects in the place of delivery at work. The working conditions are important in the work of the teachers, in this sense, teachers needs to understand the functioning of the capitalist society with its contradictions to better face the problems that they endure, that would allow them to manage well their working conditions in order to emancipate their conditions of being exploited (Vieira & Vaillant, 2017).

In Brazil, there are legal provisions that define the working days of professors that are influenced by international treaties to which the country is a signatory in a document of recommendation OIT/UNESCO of 1966 on the working condition of teaching staff, and then, the UNESCO recommendation of 1997 concerning the status of higher education staff (Jacomini andt al., 2020). In the 1966 prescription, the teaching day is dealt with in point IX, as well as the parts of favorable conditions for an effective teaching and learning process.

Generally, for any country to have good working conditions in any basic education system, certain criteria must be met, and these criteria can start with the regulations on the number of hours worked per day and per week by the teachers. In addition, material determinants refer to pedagogical working conditions : the teacher's workload; the number of students per teacher, per day, and per week; didactic material; school facilities and hours of collective activities at school ; time for adequate planning of classes and the time necessary for the preparation of lessons and correction of exercises (Ribeiro et al., 2018). These working conditions must be consulted in advance by school officials. Then, take into account the number of different lessons to be given per day, the time needed for the teacher to participate in research and extracurricular activities to supervise and guide students, finally, the desirable time for teachers to inform parents or guardians the progress of students (Jacomini et al., 2020).

On the contrary to this, teachers face unfavorable working conditions, daily aspects such as loss or lack of pleasure, negative interactions with staff, more working conditions, poor student behavior, high workload and stress (De Almeida Araújo et al., 2020). These conditions are part of one of the factors that influence teachers' decision to leave school (De Almeida Araújo andc al., 2020). In this regard, Pinto (2009) highlights what Barbosa found that:

The teaching workload exceeds the teaching workload and normally, in the comparisons made, only the teaching hours are considered without taking into account all the extra time (often unpaid) this professional has to spend. Preparation of lessons, correction of students' activities, etc. As a result, it is assumed that teachers work fewer hours, without considering out-of-class work as difficult to measure (Carvalho, 2015, p11).

The work done by teachers in basic education is often marked by factors that can lead to professional wear and tear, such as overtime, lack of material and educational resources, overcrowding in classrooms and the tension felt in the relationship with students, inexpressive participation in policies and institutional planning, and lack of safety in the school context (De Almeida Araújo et al., 2020). This work overload, as well as the lack of ideal working conditions has consequences on teachers' health, especially when there are physical and

emotional alterations that negatively affect the health and quality of life of these professionals (De Almeida Araújo et al., 2020).

The numbers on the dynamics between work and health condition of teachers in basic education in the municipal public network of Vitória in Brazil showed that out of 607 teachers surveyed, 44,98% expressed health problems related to mental disorders due to the lack of public policies in terms of attention to teachers' health and very precarious working conditions (De Almeida Araújo et al., 2020). According to Pucella (2011), with burnout, teachers cite social, demographic and economic reasons for retiring or leaving the profession (Berg & Felicia, 2015). Lourenço (2011) and Noronha (1991) mention that the increase in working hours, low salaries and precarious operating conditions in public schools have created a scenario of increasing devaluation of teachers that the category has faced with mobilizations and strikes since the late 1970 (Jacomini et al., 2016a).

To understand the working time in which the Brazilian teacher is subjected in basic education, it refers to the understanding of the number of classes, subjects and the number of students per class that have a direct impact on the duration of the teacher's working day outside the classroom (planning of activities, correction of assignments and exams (Alves & Pinto, 2011). In relation to all this, the professional development and social competence of teachers must be compatible with their professional life economic in order to stay in the profession, because, the premature retirement of teachers contributes to the increase of the rate of turnover in schools due to their low economic reality (Nweke et al., 2006). Thus, even if there are decisions to retire, some teachers have chosen to leave definitively for doing other types of activities.

1.2.2.3 Voluntary Departure

The departure movement shows that it is a final resolution made by the teacher who was working in a school in year 1, and decides not to stay in the profession by dropping out, in relation to which, we will never find this teacher in the profession (Gary Barnes & Edward Crowe, 2007). That is the permanent departure of a teacher in a school, and this represents a disruption and associated costs to students, to remaining teachers, as well as to academic directors (Levy et al., 2012). Calculations of the cost of turnover often include the dollar value that had been added to the initial steps such as induction, in-service training, as well as the cost of hiring a new person to replace that departure (Nweke et al., 2006).

Generally, the fact that many of many academic directors doesn't take academically into account some teachers staff entirely, this implies on their side reactions of disengagement and development of attitudes to leave the profession according to their unmet needs in schools, which is considered a planned action by teachers following various unresolved issues, because, with time their patience becomes fragile (Kamanzi et al., 2017).

In others aspects, for example, some school's directors refuse to accept into their academic offices pupils who have violated the rules of a classroom in which teachers are present, while, other schools receive unruly students at the request of teachers without really solving the behavioral problem of these pupils. In this cases, these schools routinely give more credence to the pupils' word than to the teachers' word, with the result that teachers quickly lose their authority in the classroom with students who know that such deviant behavior will not be sanctioned (Kirsch, 2006). Thus, when teachers strongly disagree that their administration supports them, they are more than twice as likely to move or leave teaching (Carver-Thomas & Darling-Hammond, 2017).

In the United States in the New Orleans High School Student, two teachers were absent most of the week and the leader had no teacher in her last period of civics, because the civics teacher left almost halfway through the year because she got a better job at another parish (Darling-Hammond & Podolsky, 2019). According to the 2012-2013 Teacher Tracking Survey, the National Center for Education Statistics (NCES) reported that 8,0% of public sector teachers left the field, with 53,0% reporting better working conditions in their new position (Olsen & Huang, 2019). Teacher preparation pathway influenced turnover as well, as, those who entered the profession through a certification program were 25,0% more likely to leave than full-time teachers who began teaching in a regular certification program. In Brazil, teacher age is also related to turnover rates, with the youngest and oldest categories of teachers having higher rates than those who were in mid-career (Vicentini, 2003).

The departure is explained by the final steps taken by teachers to leave education voluntarily in relation to a kind of dissatisfaction based on a situation that they are unable to resolve. In the academic years 2011-2012 and 2012-2013, there were 67,0% of teachers who had voluntarily rotated out before retirement (Carver-Thomas & Darling-Hammond, 2019). These were dissatisfactions with school evaluations, as well as the effects of accountability measures on their program. Their departure is a function of dissatisfaction with their relationship to the school administration and the need for a higher salary. With unfavorable treatment, they do not consider teaching as a career, especially with the lack of classroom autonomy (Podolsky et al., 2019). Temporary and special turnovers become frequent in periods

preceding the request for dismissal, that is, the final exit (Lapo & Bueno, 2003). In this sense, Saul Neves de Jesus mentioned in his doctoral thesis:

Regarding the career stage in which the teaching profession is most frequently abandoned, the critical period is considered to be the first two years of professional practice, according to the results obtained in several surveys (Sweeney, 1991). For example, Mark and Anderson (1985) found that at least one-third of teachers leave the teaching profession within the first four years of professional practice. Similarly, Schlechty and Vance (1983) estimated that approximately one-third of teachers leave teaching within the first five years and 15% do so within the first year of professional experience (Lapo & Bueno, 2003, p 72).

Thus, teachers have experienced solitary constraints that are at risk causing a kind of professional exhaustion such as the representation of a busy classroom without possibilities of avoidance, and the complexity of changing programs. The lack of caesura between professional and family tasks and lack of social recognition (Zavidovique et al., 2018).

According to OECD (2016), once in service, teachers receive limited support, whether in high or low-income countries (Stromquist, 2018). The salaries teachers can expect are often lowest in urban and poor rural school districts serving the most disadvantaged students exacerbating inequities (Darling-Hammond & Podolsky, 2019). And then, schools were left with fewer resources to meet the growing needs of students, the result was increasing turnover and unrest in the teaching profession (Darling-Hammond & Podolsky, 2019). In relation to all these facts, it is necessary to say the reason to study this phenomenon within the educational system.

1.3 Why is it Important to Study this Phenomenon ?

Education has historically served at the same time to transmit an ideology or to transform the society (Vieira & Vaillant, 2017). In the process of this transformation of society, teachers are important actors, because they provide knowledge to the various citizens in a country in order to lead them to a professional level in their lives. In the same order of idea of social transformation, the implementation of a set of public policies by the State for the development of a country to solve social problems is important, more precisely the implementation of an educational public policy which is close to our research work.

According to Jannuzzi, a public policy is a set of interdependent actions, operated by different agents, coordinated by public entities, aimed at responding to a collective demand, the promotion of a socially desired goal, a solution or mitigation of a problem recognized as undesirable (Jannuzzi, 2020). And, all these actions in public policies can be classified in a programmatic perspective as health, educational, economic, environmental and social policy through social assistance of citizens, food security, income transfer and productive inclusion (Jannuzzi, 2020).

Therefore, the educational policy is very important in a country, and, its understood as the actions planned and implemented by the government with the aim of organizing, orienting, promoting and expanding access to education, setting objectives to be achieved in the short, medium and long term (Godoy & Polon, n.d.). The implementation of public policy through its various phases (formulation, implementation and execution, evaluation) is important to facilitate decision-making to solve problems. However, decision-making on policy implementation requires a set of statistics and indicators selected on the basis of the direction of government policy, the nature of the programs, the priority social issues to be addressed, and the target audiences to be served (Jannuzzi, 2020).

The policy formulation phase refers to the process of generating a set of plausible policy choices to solve problems (Wu et al., 2014). Policy and program development includes various processes and activities related to the development of potential solutions within the government's priority list (Jannuzzi, 2020).

The implementation of public policies is a dynamic process and a form of networked governance whose main characteristic requires broad coordination among an extraordinarily wide range of actors (Wu et al., 2014). This phase is considered the most difficult and critical for public managers, occurring at the stage of the public policy process where public policy decisions are translated into action (Wu et al., 2014). In the implementation and execution phase of a program, a system of key indicators is needed to monitor the procedural implementation of the program in the input-process-output-impact logic.

The public policy evaluation phase refers to all the activities undertaken by a range of state and social actors to determine how a public policy has performed in practice, as well as to estimate how it is likely to perform in the future by practically examining the means used and the objectives achieved by a public policy (Wu et al., 2014). In the evaluation phase, there is Ex Post evaluation (by outcome or impact), and Ex Antes or In Itinere evaluation (by process or monitoring). There are five main types of program evaluations:

- Effort evaluations are attempts to measure the amount of program inputs - staff, office space, communication, transportation, and so on - all calculated in terms of the monetary costs they entail;
- Performance evaluations look at program outcomes - such as the number of hospital beds or school seats, or the number of patients served or children educated - rather than inputs. Their main purpose is simply to determine what the policy produces, often independently of the objectives set;
- Process evaluations examine the organizational methods, including operating rules and procedures, used to implement programs;
- Efficiency evaluations attempt to assess the costs of a program and judge whether the same quantity and quality of results could be achieved more efficiently, i.e., at lower cost;
- Performance adequacy evaluations (also called effectiveness evaluations) compare the performance of a given program to its proposed objectives to determine whether the program is achieving its objectives and/or whether the objectives need to be adjusted in light of the program's achievements (Wu et al., 2014, p.121).

In fact, the evaluation phase has different types of information to analyze in order to see to what extent the programmatic actions have contributed to the mitigation of the social problems identified in the diagnosis through statistics and indicators that account for effectiveness, to see whether the program achieved its objectives; efficiency, and if the resources been well used ; and social effectiveness, to see the real impacts generated by the program on the beneficiaries and on society (Jannuzzi, 2020).

All public policies formulated, implemented and evaluated by the State leaders are important to make a change in societies if they are well planned and executed, and, it is also important to briefly address in this work the issue of educational public policy in Brazilian basic education. Without a good and effective public educational policy in basic education, many teachers will continue to be affected by this problem and fewer citizen will be well trained. We know that every citizen has the right to basic education in the first years of their lives, which would allow them to have knowledge and competence to act in the future in any other chosen field in society.

The school systems are increasingly grappling with retention challenges in the teaching force (Kamanzi et al., 2017). In this context, the Brazilian educational institutions already submitted to a public educational policy specify to have a strong school innovation to face the problem of the teachers' turnover, because when the teachers leave the education, it hinders the

good functioning of the schools. However, in order to make an innovative educational policy, it is necessary to have in hand the evaluative elements of the basic school system in order to elaborate a map of processes and results to be carefully analyzed. These elements of the process map will be established in a context which is linked to the target public and condition of supply of the schools, linked to the available school resources and the content of the various activities already carried out in the schools, as well as the school products, then, to carry out an evaluation of the results and impacts of these elements in basic education. Analyzing all of this will allow to address the problem and to make good educational innovation.

When researching information about teachers according to Unesco (2004), researchers from around the world discuss the fact that teachers working in primary and secondary education are confronted with the roles assigned to them (Machado & Lucas, 2017). In addition to this, Tardif and Raymond (2000) talk about a need for cognitive, instrumental, socialization and professional experience for the construction of professional identity to occur in the work of teaching; then, emotional, relational and symbolic elements must be involved in this process of constitution so that a person can consider themselves and live as a teacher in order to subjectively and objectively assume the choice to make a career in education (Machado & Lucas, 2017). According to Huberman (1992), there is a list of issues on teachers' careers of which we will give some examples like namely crises, events, trajectories, historical moment, job satisfaction, choices, options, caution (Machado & Lucas, 2017).

Therefore, when there is a lack of career, there is a turnover of staff that makes impact on all organizations, this is considered a concern because of its potential for negative effects on the results of an organization (Banister, 2017). Thus, there are many reasons to study this phenomenon, in this sense, it is important to do so to evaluate it in order to take decisions on how we are going to solve it, because, actors are suffering because of this problem that impact schools. That is, when a teacher leaves an institution at the end or during a school year, it affects the functioning of the school and the learning of the students.

In Brazil, primary school enrollment is almost universal, but there are quality problems and serious resource deficiencies in public schools, especially those in poor areas. Less than half of secondary school students have survived without repeating a grade in Brazil (McCowan, 2005).

Teacher turnover is costly in terms of money for teacher replacement, and in terms of learning about the quality of students' education (Darling-Hammond & Podolsky, 2019). It has impacts on student achievement in terms of learning, then, it also requires school districts and states to spend money to recruit, hire, and train substitutes (Gary Barnes & Edward Crowe, 2007). According to data available on the Alliance for Excellent Education website, teacher attrition generates very high costs for education systems (Cassettari et al., 2014). Thus, the turnover's teacher affects the quality of learning and reduces student achievement while preventing the efficiencies that can accompany the teacher experience (Darling-Hammond & Podolsky, 2019).

Teacher turnover has become the first line of critical factors to be addressed to improve education (Bauer et al., 2017). Whenever this happens, it should be a matter of concern and reflection in order to improve their task to solve this problem. The abandonment of teachers is not only a loss, but also weakens the quality of learning in the institutions concerned. In any profession, skills improve with the number of years of experience, but the schools affected by this phenomenon are not able to provide high quality training. Teacher turnover is higher in schools located in disadvantaged areas and attended mostly by people who are often vulnerable (Kamanzi et al., 2017).

Trained beginning teachers are more likely to leave after one year of initiation than those with little or no training (De Almeida Araújo et al., 2020), which would produce a shortage and decrease in the number of teachers that will impact the quality of learning, because with the stability of teachers already qualified to provide quality education, school life expectancy will be increased, even if the opportunities differ considerably from one region to another.

The frame 3 presents the indicator of teacher regularity in the educational networks for the State of Goiás. Most public schools have a regularity of teaching up to three on a scale of zero to five, and, this irregularity does not allow the teacher to have time to develop and execute pedagogical works and projects, which hinders the improvement of learning (Gomes et al., 2017). In addition, high teacher turnover generate educational deficits for students and pedagogical problems in school, reducing the teacher's ability to propose solutions and even act to resolve the situation (Gomes et al., 2017).

FRAME 3 - Percentage of Schools by Teacher regularity indicator (IRD), Brazil - 2016

Network	Low	Medium-Low	Medium-High	High
Federal	0,0	56,3	43,7	0,0
State	7,4	46,2	44,5	1,9
Municipal	7,0	35,0	48,1	9,9
Private	9,8	38,5	45,3	6,4
Public	7,1	38,6	46,9	7,4
State of Goiás	7,7	38,6	48,6	7,1

Source: MEC/INEP/Censo Escolar of Basic Education/2016, about the profile and characteristics of teachers in the state of Goiás. <https://www.imb.go.gov.br/files/docs/releases/censo-escolar-educacao-basica/censo-escolar-educacao-basica-2016.pdf>

Buarque (2007) tells us that education is the vector of social transformation through equality and opportunity, and that each child is a treasure that must be trained, education is the mine where this treasure is managed, because, education is the means to train this treasure with the aim of transforming them into citizens capable of understanding the world and acting to make it better, fairer and beautiful (Buarque, 2007). Without a good application and implementation of effective public education policy, Brazil may not have quality education that can have consequences in the education system.

Therefore, studying this phenomenon allows us to have clear ideas about what is really happened to the teachers in order to take the necessary measures to reduce or even eliminate it, from this perspective, section 1.4 presents us some studies that have been done on this phenomenon.

1.4 Studies on the Phenomenon of Turnover in Brazil

A research work cannot be done without the presence of scientific documents supporting it, in this sense, in the review of the literature on the phenomenon of turnover, our methodology of search was made on empirical research in order to have access to these knowledges. These scientific documents were searched in electronic databases, such as the site of Public Education Management and Evaluation (PPGP), Brazilian Digital Librarian of Thesis and Dissertations (BDTD), Google Academic and on the Scientific Electronic Library Online (SCIELO) in order to get dissertations, theses and scientific articles. During the realization of the bibliographic search, we took into account 4 steps: identification, selection and extraction, eligibility, and then inclusion. At the beginning, we defined a research theme and launched the identification step.

In the identification, the adapted keywords in our documentary research are: Teacher Turnover, Abandonment of the Profession, Teacher's Migration and Basic Education. They were used into the web browser of the periodic site of Google Academic which led us sometimes to Scielo and Capes, and which gave us a list of information about the research in question. In this step, from the keywords defined in the web browsers, a total of 36 articles were downloaded, with 23 in the Google Academic database, 11 in Scielo, and 1 in the site of Public Education Management and Evaluation (PPGP), and 1 in Brazilian Digital Librarian of Thesis and Dissertations (BDTD). It should be mentioned that the common units of analysis found in all these documents are: Schools and Professors, specifically in the areas of Curitiba, Goiás, Porto Alegre, Rio de Janeiro and Franco da Rocha/SP in Brazil. Then, we went through the selection and extraction process.

In the selection and extraction process, we have selected only 28 of these 36 documents that were have found in the identification phase, i.e., we put aside 8 documents. These documents were divided by publication type like scientific articles, thesis and dissertations. A second analysis allowed us to keep only 20 articles from these 28 selected. In resume, a total of 16 were left out, and in this number left out, a large majority was part of the international journal. Then we moved on to the penultimate phase that is selection.

In this selection step, the 20 selected had relevant information about the phenomenon in Brazil to support our work, as they were eligible. They were distributed as follows: with 15 in the Google Academic database, 3 in Scielo, and 1 in the Public Education Management and Evaluation (PPGP) website, and 1 in Brazilian Digital Librarian of Thesis and Dissertations (BDTD) Then, as for their characteristics, the years of publication were from 2003 to 2021; then, in the distribution by type of scientific publication of documents, we had got 2 theses, 9 dissertations and 9 scientific articles; then, by discipline they were distributed to 4 in Economics, 3 in Administration and 13 in Education.

It should be said that the methodological approach used in these documents covers three types of methods: qualitative, quantitative and mixed method; and among them, 2 documents use the mixed method (qualitative and quantitative), then 11 are of quantitative types, and 7 are of qualitative types. In fact, the documents are almost equally divided between quantitative and qualitative studies. It should be noted that the majority of the documents found use the quantitative method. Then we moved on to the last step which is inclusion.

FRAME 4- List of scientific documents on the bibliographic research on teacher turnover on Brazil

Disciplines	Documents	Institutions	Authors / Years	Total
Education	Thesis	PUC/RJ	Cunha (2015)	1
	Dissertations	PUC/SP	Silva (2007)	5
		Universidade Federal de Juiz de Fora/UFJF	Goveia (2017)	
		Universidade Federal do Paraná / UFPR	Frantz (2018)	
		Universidade Federal do Rio Grande do Sul/ Porto Alegre	Mari (2011)	
		Universidade Federal do Rio de Janeiro	Lopes (2018)	
	Scientific Articles	Cadernos de Pesquisa, n. 118, p. 65–88	Lapo e Bueno (2003)	7
		Universidade Estadual de Londrina, Programa de Desenvolvimento Educacional (PDE) SEED/PR	Azevedo (2012)	
		Cad. Pesqui. [online]. 2016, vol.46, n.160, pp.312-332.	Pereira e Oliveira (2016)	
		Cad. Pesqui., São Paulo, v.51, e07211, 2021	Frantz e Alves (2021)	
		11º Congresso de Inovação, Ciência e Tecnologia do IFSP – 2020	Thayná e Tamara (2020)	
		Práxis Educativa, Ponta Grossa, v. 13, n. 3, p. 734-749, set./dez. 2018	Pereira e Oliveira (2018)	
		Rev. Bras. Educ. vol.24 Rio de Janeiro 2019	Carlotto; Câmara e Oliviera (2019)	
Administration	Dissertations	Universidade Metodista de São Paulo	Matui (2011)	1
	Scientific Articles	RACEF – Revista de Administração, Contabilidade e Economia da Fundace. v. 7, n. 2, p. 94-107, 2016.	Siqueira e Alves (2016)	2
		Braz. J. of Develop., Curitiba, v. 6, n. 6, p. 39436-39458	Rosas; Souza; Silva ; Azêvedo e Azevedo (2020)	

Economy	Thesis	Universidade federal do Paraná / UFPR	Carvalho (2019)	1
	Dissertations	Universidade de São Paulo /USP	Paula (2012)	3
		Universidade Federal do Paraná / UFPR/Curitiba	Peixoto (2020)	
		Universidade Federal do São Paulo /USP	Duarte (2009)	
Total Documents				20

Source: Developed by the author from the literature review (2022)

In this last phase that is inclusion, after having passed all the previous key steps and considered as eligible these 20 research documents with their own characteristics, these scientific documents were selected and included step in the Excel grid as analysis and review of scientific literature. In the frame 4 below, we have the list of the bibliographic research on turnover in Brazil presenting these 20 scientific documents.

All of these scientific documents (articles, dissertations, theses) have discussed on teacher turnover and have an empirical approach to the issue. They have common unit of analysis which is "Teachers", the adapted methods are quantitative/qualitative and mixed, and their analysis data are from secondary sources. Below in frame 5, we also present 3 of these documents with their authors, units of analysis, as well as the explanatory variables used by these authors in the process of analysis of this phenomenon.

FRAME 5 – Matrix of Units of Analysis and Explanatory Variable of the turnover on Brazil

Authors (Year)	Analysis Unit	Explanatory variable of the phenomenon
Peixoto Amanda Gentil (2020)	- Teacher - School Performance	Portuguese, Mathematics, TE, TS, TR, TR2, School Building, Computer Lab, Library, Number of Rooms, Number of Computers, Women, White, Age, Specialization, Schooling
Pereira Junior, Edmilson Antonio & Oliveira Dalila Andrade (2016)	- Teacher - School	- Administrative dependence (federal, state, municipal, and private) - Location (urban and rural) - Level of attendance (kindergarten, elementary school, and high school)
Frantz Maíra Gallotti (2018)	- Teacher	- Political-administrative organization of the RME: City region (v6), Weighting, Hard-to-staff bonus policy, % hard-to-staff bonus; - Characteristics of the supply of education: Size; Combination of stage/segment/modality of attendance of Basic Education, Teaching hours; Social Vulnerability Area: Social Vulnerability Indicator, % of students benefiting from the Federal Family Grant Program; - Teaching work conditions: % teachers without pedagogical training, % teachers with normal high school education, % teachers with undergraduate degree, % teachers with specialization, % teachers with master's or doctoral degrees, average number of students per class, number of students per teacher; - School results in external evaluations: Basic Education Development Index, % Ideb increase.
Edmilson Antonio Pereira Junior, Dalila Andrade Oliveira (2018)	- Teacher	Early Childhood Education, Primary School - early years, Secondary School - late years, High School, without information, Type of hiring, Permanent/Permanent/Stable, Temporary contract, Outsourced contract, CLT contract, Location of school, Urban, Rural, White, Black, Brown, Yellow, Indigenous, don't specify.

Source: Developed by the author from the literature review documents (2022)

These studies present information on the turnover of Brazilian teachers in order to understand how this phenomenon is woven throughout the life and professional experience of these teachers. Investigative and identification work was done one through these studies in order to know the potential explorative factors that influence the turnover of teachers in Brazilian primary and secondary education.

Although these literature reviews provide information and discuss the problematic of the teachers, they encourage to understand the need to give importance to the teachers in relation to the educational work that they have already carried out in the schools with the purpose of forming citizens. These studies propose us measures that allow us to understand the description of this phenomenon known as recurrent in the schools while seeing the impacts and some of them have proposed an action plan. These reviews diagnose the characteristics of teachers and schools and analyze the incidence of the turnover of these teachers in the reality of the Brazilian public basic education system so that pedagogical alternatives can be taken by the educational managers to overcome the problem of this turnover.

In all these works, a set of explanatory variables were presented to analyze the facts, and of these variables many of them are similar in the choice of each of these different authors. For example, Pereira Junior, Edmilson Antonio, Oliveira Dalila Andrade (2016); Frantz, Maíra Gallotti (2018) use the administrative dependency variable in the same context in the problem of teacher turnover.

Therefore, the fact that these studies present and analyze teacher turnover in public elementary schools in Brazil, helps us in this discussion to understand the Brazilian context and puts us on the right track to have arguments in order to continue this work that aims to examine also the Brazilian teacher turnover.

Finally, these literature reviews contribute in the support of our study and allow, on the one hand, to better understand this phenomenon from different angles and to communicate with the elements chosen in the literature review section, and, on the other hand, they help us in the choice of the methodological approach in section 2.

To close this section, we have presented the theoretical approach in four phases: firstly, we presented the evolution of teachers in basic education through their training and recruitment, and laws that support them; secondly, we have shown what is the teachers' turnover and some main aspects that accompany it, and its aspects focus on the migratory movement related to the search of better treatment, the question of retirement related to the working conditions they face in the institution; Third, we presented the importance of studying this phenomenon while showing that teachers' turnover acts on the institutions either at the end or during the school period affecting the functioning of the school institutions and generating problems; finally, we have presented several studies that have been carried out on this phenomenon in Brazil to help us to better understand this phenomenon. For next step we have presented an appropriate methodology for our work in section 2.

2 Methodological Approach

The methodology is defined as a good use of method and technique, and, a method is a logical procedure to achieve a scientific work (Aktouf, 2006). In this work, we will apply a technique widely used in scientific research methodology. In order to carry out this section, we have divided it into five parts, in the first part we have presented the context of the study; secondly, we have presented the process of data collection; thirdly, we have presented the preparation of the data and the procedures for calculating the rate of turnover; fourthly, there is a selection process and description of the variables; and lastly, we have presented the methodology of analysis to finish the section.

2.1 Context of the Studies

In this section, the study is located in a temporal limit and in a specific geographical space. Spatially, the study is carried out for the network municipality of Goiania in the state of Goiás, focusing on the basic educational public institutions covering this State. As for the temporal limit, it is based on a period of two years, that is for the period of 2016 and 2017. Goiás is one of the 26 Brazilian states, located in the Midwest region of the country and occupying an area of 340,106 km² (Borges, 2018). Seventh State in territorial extension and has a privileged geographical position. Goiás has 246 Municipalities and a population of 6,779 million inhabitants in 2017, and Goiania is the capital, it is the metropolitan region while having a group of 20 Municipalities housing 2,494 million inhabitants (Borges, 2018).

After seen the population of Goiás, it is important to also know the school population in this time, to do this, let's go to see the number of students, schools and teachers during this year. So, regarding the number of the educational population in 2017:

On the number of students in the network municipality of Goiania, data from the Educational Data Laboratory (LDE) showed that there was a total of 280,731 students enrolled in all schools. In the public schools there were 167,377 who were distributed in the administrative dependency as follows: 2,539 in the Federal, 67,743 in the State, and 97,095 students in the Municipal; in private schools there were a total of 113,354 students enrolled distributed as follows: 14,234 students in the Private convened non-profit, 4,930 in the Private convened for-profit, 11,300 in the Private non convened and non-profit and 82,890 students enrolled in the Private non convened and for-profit (Lde, 2017).

Then, the number of existing schools were 797 in the city of Goiania in 2017 referred to the table 1. In public schools there were a total of 414 schools distributed in the administrative dependency as follows: 3 in the Federal, 108 in the State, and 303 schools in the Municipal; in private schools, there were a total of 383 schools distributed as follows: 66 in the Private convened non-profit, 5 in the Private convened for-profit partnership, 17 in the Private non convened and non-profit and 295 schools operating in the Private non convened and for-profit (Lde, 2017).

The number of teachers working in all schools referred to the table 1 were estimated at 13,914 in the network municipality of Goiania. In public schools there was a total of 8,008 teachers who were distributed in the administrative dependency as follows: 347 in the Federal, 2,822 in the State and 4,839 teachers in the Municipal; in private schools there were 5,906 teachers recruited distributed as follows : 700 in the Private convened non-profit, 176 in the Private convened for-profit partnership, 627 in the Private non convened and non-profit and 4,403 teachers working in the Private non convened and for-profit (Lde, 2017).

Therefore, table 1 below shows the different data explained above on the school population in the network municipality of Goiania in the State of Goiás during the year 2017.

TABLE 1 – Presentation of the numbers of Schools, Teachers and Students per Administrative Department in the Network municipality of Goiania in the Public and Private Networks, Brazil -2017

Administrative Department	Students Enrollment	Teachers (*)	Schools	
Federal	2,539	347	3	<i>Public Schools</i>
State	67,743	2,822	108	
Municipal	97,095	4,839	303	
Subtotal	167,377	8,008	414	
Private convened non-profit	14,234	700	66	<i>Private Schools</i>
Private convened for-profit partnership	4,930	176	5	
Private non convened and non-profit	11,300	627	17	
Private non convened for-profit	82,890	4,403	295	
Subtotal	113,354	5,906	383	
Total	280,731	13,914	797	

Source: Prepared by the author from Censo Escolar 2017 available in Educational Data Laboratory (dadoseducacionais.c3sl.ufpr.br)

(*) A teacher can be counted more than once, if he/she works in more than one aggregation unit: municipality, school, stage/modality, locality, and administrative department

These data in table 1 above indicate that in the network municipality of Goiania, the number of students in public schools was greater than the number of students in private schools, with a surplus of 54,023 students in public schools. Secondly, the number of teachers working in public schools exceeds those in private schools, i.e., 2,102 teachers. As for the number of public schools available, there is a surplus of 31 over the number of private schools that exist (Lde, 2017).

The student-teacher ratio is the average number of students trained in class divided by the number of teachers (Eurostat, 2018). In this sense, we can say too that it is the number of students trained in an educational network divided by the number of teachers in that same network. As a result, the overall ratio for public schools is estimated at 20,9%, while the overall ratio for private schools is 19,1% in Goiania. Therefore, in relation to the number of students and teachers existing in the network municipality of Goiania in table 1, the overall ratio of public schools in the network municipality is estimated at 20,9%, while those of private schools is 19,1%.

This shows that public schools have a higher student-teacher ratio compared to private schools, which means that teachers in public schools have more student to be served in class. In other words, for every 20 students in public schools there is one teacher for the workload, and there are 19 students in private schools for one teacher. Finally, the overall ratio for all schools in the network municipality in 2017 is estimated at 20,18% (Lde, 2017).

The ratio gives an idea of the number of students in the educational institutions per class and helps us to analyze the number of students that the teachers in the educational institutions have in their classrooms that are related to their condition and workload. In fact, teachers in public schools have a higher number of students in their classrooms than in private schools in the network municipality. Whenever there is a high student-teacher ratio, this shows that workloads become more complex for the teacher and the relative access of students to trained teachers is lower in schools (Unesco, n.d.).

Therefore, in relation to the number of students and teachers existing in the network municipality of Goiania in table 1, the overall ratio of public schools in the network municipality is estimated at 20,9%, while those of private schools is 19,1%. This shows that public schools have a higher student-teacher ratio than private schools, which means that public school teachers have more students to serve in class. In other words, for every 20 students in public schools, there is one teacher for the workload, and there are 19 students in private schools for one teacher. Finally, the overall ratio for all schools in the network municipality in 2017 is estimated at 20,18% (Lde, 2017). Finally, what is important is that student enrolment

standards are met in schools to facilitate a normal workload. Now, let's move on to data collection procedures. Finally, the important thing is the respect of the norms on student numbers in schools in order to facilitate a normal workload for teachers. Now, let's move on to data collection procedures.

2.2 Data Collection Procedures

Data collection is a process of searching for and gathering data from sources that may be primary or secondary in order to analyze and process them for use. In this procedure, we have focused on secondary source data. According to Smith (2011), secondary data is a valuable source for researchers, despite its high volume on the internet, it is often underutilized by educational researchers (Cohen et al., 2018). Glaser (1963) tells us that in general that secondary data and its analysis works was originally collected for a different purpose (Cohen et al., 2018). In this same idea, Heaton (1998) mentions that secondary data analysis can also be run on pre-existing data, sometimes from the same researcher but usually collected by someone else (Cohen et al., 2018). According to Vartanian (2011), these data are available to answer new or additional research questions and new objectives, or reanalyze the data from a new angle with new analysis tools (Cohen et al., 2018).

The data selected for this research work were obtained from the Censo Escolar/INEP containing a large number of variables for use and verification to calculate teacher turnover in schools (Castro & Almeida, 2020). Section 2.3 presents the preparation of these data and three procedures for calculating the turnover rate for the selected network municipality. These data were obtained for basic education for the year 2016 and 2017, because, these are the most recent years available from INEP that allow longitudinal analysis. As of 2018, INEP created random codes for teachers in each year and this makes longitudinal analysis of teachers' status impossible for the years after 2017.

2.3 Data Preparation and Procedures for Calculating the Turnover Rate

This subsection consists of procedures of data preparation and application of a formula selected in the statistical software of IBM SPSS 25 in order to calculate the rate of teacher turnover so that we can have information on the number of teachers that leaves and moves in the network municipality. The sources of data used are the databases of teachers and schools from the micro data of Censo Escolar / INEP of the years 2016 and 2017⁵. The using of these sources is reliable and they cover and school population of the network municipality of Goiania.

Frantz and Alves (2021) made a parallel between six formulas that others authors have already used to calculate the rate of turnover staff (Frantz & Alves, 2021). The different results found by the authors using these formulas in frame 6 were compared and analyzed in the process of calculating the rate of teacher turnover in their work. The formulas analyzed and compared are presented in the frame below.

⁵ The calculation of the turnover rate for years greater than 2017 is not possible from the micro data available on the INEP website due to compliance with the Access to Information Act, Law No. 12.527/2011. Under the justification of data protection and personal information of teachers, INEP has begun from 2018 to assign different individual identification codes to each annual survey. Thus, studies that require Longitudinal analyses of teachers in different years of the school census are subject to a face-to-face process. Face-to-face consultation, in Brasília/DF, at INEP's Protected Data Access Service (SEDAP), in accordance with Ordinance No. 52/2019.

FRAME 6 – List of formulas analyzed and the one selected for the calculation of teacher turnover

Pereira Júnior e Oliveira (2016)	Campos e Malik (2008)	Nomura e Gaidzinski (2005)	MTE (2013)	IBGE/PIMES	Frantz and Alves 2018)
$\frac{E + S}{N(i - 1) + N(i)}$ <p><i>Where :</i></p> <p>E = number of teachers entered for the teaching unit in year (i) compared to the previous period (i - 1);</p> <p>S = number of teachers who left the teaching unit in year (i) compared to the previous period (i - 1);</p> <p>N(i - 1) = total number of faculty with teaching units in the previous ;</p> <p>N(i) = total number of faculty at teaching unit during the period under analysis.</p>	<p><i>Number of disconnections in a period</i></p> <p><i>Total number of employees at the end of the period</i></p>	$\frac{D}{(M_i + M_f)}$ <p><i>Where :</i></p> <p>D = number of disconnections in analyzed period;</p> <p>M_i = number of workers in the beginning of the period considered ;</p> <p>M_f = number of workers in the end of the period under consideration.</p>	$\frac{\min(\text{ADMt, DEST})}{\text{Average size of the work force in a period average stock of workers between the beginning and end of the fiscal year}}$ <p><i>Where :</i></p> <p>min(ADMt, DEST) = Lowest value found between admissions and terminations in the research reference period.</p>	$\frac{\min(\text{ADMt, DEST})}{\text{POA}(t - 1)}$ <p><i>Where :</i></p> <p>min(ADMt, DEST) = lowest value found between admissions and terminations in the search reference period;</p> <p>POA (t - 1) = total number of employees in the immediately preceding period.</p>	$\frac{S}{N(i - 1)}$ <p><i>Where :</i></p> <p>S = total number of teachers who left the school, obtained by comparing the total number of teachers in the year analyzed (i) and in the previous year (i - 1);</p> <p>N (i - 1) = total number of teachers in the year immediately preceding the year under analysis (i)</p>

Source: Frantz and Alves, 2021, p. 8, presented as model in article of Proposal for a Teacher Turnover Indicator in Basic Education *Caderno Da Pesquisa*, V.51, 22. <https://doi.org/https://doi.org/10.1590/198053147211>

Frantz and Alves (2021) compared these formulas described in frame 4 above and analyzed by three groups the case of teachers' turnover in schools: the first group (A to E) was based on the number of teachers who entered and left in equal amounts; the second group (F to J) was based on teachers in which the number of enter is greater than those who leave; and the third group (L to O) was based on teachers in which the number of leavers is greater than those who come in (Frantz & Alves, 2021). After their analyses and comparison between schools, they made the choice of the formula that minimizes the most error of turnover rate in terms of results in frame 7 below.

FRAME 7 - Model of Calculating Teacher Turnover by Hypothetical Situations

Schools	Total Professors 2015	Leavers	Entrance	Total Professors 2016	Teacher Turnover Rate					
					Pereira Júnior and Oliveira (2016)	Campos e Malik (2008)	Nomura and Gaidzinski (2005)	MTE (2013) *	IBGE/PIMES*	Results of the rate calculated by the formula proposed by Frantz and Alves (2021)
A	60	5	5	60	8,3%	8,3%	8,3%	8,3%	8,3%	8,3%
B	25	2	2	25	8%	8%	8%	8%	8%	8%
C	30	0	0	30	0%	0%	0%	0%	0%	0%
D	40	4	4	40	10%	10%	10%	10%	10%	10%
E	50	10	10	50	20%	20%	20%	20%	20%	20%
F	60	5	13	68	14,1 %	7,4%	7,8%	7,8%	8,3%	8,3%
G	25	2	7	30	16,4 %	6,7%	7,3%	7,3%	8%	8%
H	30	0	5	35	7,7%	0%	0%	0%	0%	0%
I	40	4	8	44	14,3 %	9,1%	9,5%	9,5%	10%	10%
J	50	10	12	52	21,6 %	19,2%	19,6%	19,6%	20%	20%
L	60	5	2	57	6%	8,8%	8,5%	3,4%	3,3%	8,3%
M	25	2	0	23	4,2%	8,7%	8,3%	0%	0%	8%
N	40	4	2	38	7,7%	10,5%	10,3%	5,1%	5,0%	10%
O	50	10	3	43	14%	23,3%	21,5%	6,5%	6%	20%

Source: Frantz and Alves, 2021, p. 9, presented as model in article of Proposal for a Teacher Turnover Indicator in Basic Education *Caderno Da Pesquisa*, V.51, 22. <https://doi.org/https://doi.org/10.1590/198053147211>

The calculation of these percentages, when carried out within the framework of the MTE (2013) and IBGE, is preceded by an analysis of the replacement indicator, in order to characterize the scenario, either in contraction, i.e., when the number of exits is greater than the number of entries, or in expansion, i.e., when the number of exits is less than the number of entries (Frantz & Alves, 2021, p.9). Therefore, this same formula selected by Frantz and Alves (2021) is used in this research work to perform the calculation of this teacher rate who leave and migrate:

$$\frac{S}{N(i-1)} \times 100$$

With the following explanations:

S : Total number of teachers who left the municipal education network by comparing the total number of teachers in the active year (i) with the past period (i - 1);

$N(i - 1)$: Total number of teachers in the municipal education network in the past period (i - 1) compared to the current period under analysis (i).

Teacher turnover can be analyzed from several angles, but we will take into account the general turnover rate, as well as the teachers who migrate and leave the profession with the help of this formula. During this preparation process, three steps were taken into account:

First, a selection was applied on the teachers in order to impute, to process, and to analyze the data using the SPSS software. Three filters were applied to the teacher's database for two consecutive years (2016 and 2017). In the first filter, the delimitation was focused on the network municipality of Goiania through the variable « Co_Municipality= 5208707»; the second filter is based on the categories conventionally used by INEP and defined the «Typical_Teacher⁶» which was established on the function that teachers occupy in the school, in this filter, the teaching function covered the categories: «Teacher» and « Full Professor - coordinator of mentoring (of module or discipline) - EAD»; finally, the last filter was made on the subjects that teachers teach in the classroom⁷, and this type of filter includes the categories: «Not applicable», «Hospital class», «Socio-educational service unit» and «Prison unit» (see variables selected in frame 8).

Secondly, after the selection process, the database was aggregated using the relevant variables as: «Co_Physical_Person and Co_Entity », and the unit of analysis is the function «Teacher » in the original database. A teacher's code could be repeated as many times in the number of classes he or she teaches, to avoid repetition, this aggregation procedure removes the repetitions for each class and assigns the code uniquely in each and every school class the teacher teaches (which can be one or more). This procedure was performed separately for both databases, 2016 and 2017 while forming two new aggregated teacher databases.

Third, it is the merging process by which these two new aggregated teacher databases (2016 and 2017) were merged into a single database using the "Merge Files" command in SPSS. This was possible to the variables known as the primary key that guarantees the uniqueness of the codes assigned by INEP to teachers and schools, such as: « Co_Person_Physical and Co_Entity⁸». So, in the new database created after the merge, "2016" was considered as the reference year and the variable "Year" was renamed as

⁶ The filter used in relation to the type of teacher is the following: Tp_Teacher_Type = 1 or 5

⁷ The type of subject the teachers teach Tp_Class_Type = 0, 1, 2 or 3

⁸ Unique school and teacher identification codes used which must be the same in all editions of the School Census for the procedure to be successful

"Base_Year". Then, a new variable named "Comparison_Year" was obtained from "2017", and then a variable named «Teacher Turnover» was created after the merger.

From this new variable "Teacher Turnover" newly created in database, two tests were made: first, in the case where the primary code of the teacher that was in the base year column (teachers in 2016) was found in the comparison year column (teachers in 2017) with the value "2017", this refers to the stayers teachers ; secondly, in the case the primary code of the teacher that was in the column of the base year (teachers in 2016) was not found in the column of the year of comparison (teachers in 2017), and only the value "0" appeared, this is qualified as teacher leavers. To make the calculation of this general rate of teachers' turnover, the general variable created «Teacher Turnover» was tested. Based on this calculation, the following logical tests were performed to identify whether or not there are cases of turnover in the network municipality (see variables created in frame 9):

- a) If "Base_Year" = "2016" and " Comparison_Year " = "2017", Thus Turnover = "No";
- b) If "Base_Year" = "2016" and " Comparison_Year" = 0, Thus Turnover = "Yes".

Last step, after we have found these cases of turnover by this test on the teachers in which zero values were found in the comparison year, a second test was made to see if these cases are teacher movers or leavers. This work is based on teachers who leave and migrate, in this sense, the second test was done on variables "Turnover ", "Leavers" and " Situation" to identify and classify them in the new database used.

To do this, three situations were adopted: in the first test, in cases where the three variables «Turnover; Leavers; Situation» are equal to "0", then, it refers to teachers who stay in schools (Stayers); in the second test, in cases where the variables «Turnover; Situation» are equal to "1", and the variable «Leavers» is equal to "0", then, we can say that they are teachers who migrate (Movers) in other schools in the same district where they work, or in different districts in the federal, state or municipal in the administrative dependency; as for the last test, when the variables «Turnover; Leavers» are equal to "1" and the variable «Situation» is equal to "2", in this case, it refers to teachers who have left (Leavers) the profession in order to carry out other activities. Below, the three cases found in the SPSS software diagram (see variables created in frame 9):

- a) If "Turnover " = 0, therefore, teacher Stayer ;
- b) If "Turnover " = 1 and " Leavers " = 0, therefore, teacher Mover;
- c) If "Turnover " = 1 and " Leavers " = 1, therefore, teacher Leaver.

It should be remembered that teachers who migrate in the profession, leave the schools where they have been to work in other schools that can be public or private. When they leave the profession, it can be temporary or definitive: in the definitive case, the teachers retire or leave the teaching profession definitively; in the case of temporary departure, it can happen for reasons of health, studies, or assignment of workload in the same school where they are matriculated, in this case, a teacher can return at any time to the school.

Then, there was a new aggregation process with the variable «Co_School» from the already aggregated database by creating another new database that generated the total number of teachers in 2016, including the number of teachers that leaves and moves in 2017. With this same formula selected, other variables were taken from the original database to complete the process (see variables created in frame 10). So, the tables containing the list of these variables are obtained from the website of Censo Escolar /INEP for Basic Education and were presented in subsection 2.4, and the results of analysis will be presented in the results section.

2.4 Description of Variables

This subsection presents the set of variables used as indicators described in section 2.3 above, namely the variables selected for the turnover rate calculation procedures, the variables created in the calculation process, and finally a list of other dependent and independent variables that was added in the calculation process.

2.4.1 Selected and Created Variables in the Calculation Process

In frame 8, we have the list of variables that were selected to be able to do the three process operations, namely filtering, aggregation and merging across the two databases of Professors during the years 2016 and 2017.

FRAME 8 – List of variables selected in the two databases for the calculation operation

Variables	Descriptions	Category	Source
Co_Pessoa_Física	The identification code of each teacher	-	Data Censo Escolar / INEP (2016-2017)
Co_Entidade	The identification code of each school	-	
Tp_Tipo_Docente	Position a teacher holds in the school	1- Professor 5 - Full Professor - tutor coordinator (of module or discipline) - distance learning	
Tp_Tipo_Turma	Type of service provided by a teacher	0 - Not applicable 1 - Hospital class 2 - Social-educational care unit 3 - Prison Unit	
Co_Município	Code of the network municipality of Goiania	-	

Source: Prepared by the author (2022)

In frame 9, we have the list of variables that were created in the filter, aggregate and merge operation using both the 2016 and 2017 faculty databases for analysis.

FRAME 9 – List of variables created during the calculation process

Variables	Description	Type
Ano_Base	Base year variable that was created in the process and represents the year 2016	Qualitative
Ano_Comparação	Comparison year variable that was created in the process and represents the year 2017	Qualitative
Turnover	General turnover variable that was created in the process (No=0, Yes=1)	Qualitative Binary
Turnover_Situação	Turnover variable in context of rotativity movement that was created in the process (0=Stayers, 1=Movers, 2=Leavers)	Qualitative Nominal

Source: Prepared by the author from datas of Censo Escolar/INEP 2016 and 2017

2.4.2 Variables Selected for the Final Procedures

In frame 10, we have the list of variables selected definitively after the set of operation performed on the two databases of teachers (2015 and 2016) for analysis. These variables will be used for the analysis of turnover and regression models in public schools in the network municipality of Goiania. It must be said that other variables were chosen during the merger of the last database created permanently to have many more variables to facilitate the analysis in the next section of results.

FRAME 10 – List of variables kept for the Turnover Analysis

Variables	Description	Type	Mode
Turnovers' Phenomenon			
General Turnover (Rotatividade)	Teachers who migrate or quit (yes or no)	Qualitative Nominal	Dependent
Teachers_Leavers (Profesores_que_Saem)	Teachers who quit (Yes or No)	Qualitative Nominal	Dependent
Teachers_Movers (Profesores_que_Migram)	Number of teachers who move to other schools (Yes or No)	Qualitative Nominal	Dependent
Teachers Characteristics			
Tp_Sex_Gender (Tp_Sexo)	Gender of teachers	Qualitative Ordinal	Independent
Tp_Color_Race (Tp_Cor_Raça)	Color and race of teachers	Qualitative Ordinal	Independent
Age_Group (Faixa Etária / Idade)	Age range calculated from the year of birth of the teacher	Qualitative Ordinal	Independent
Education Level (Nível de Formação)	The level of the training received by the teachers	Qualitative Ordinal	Independent
Teachers Working Conditions			
Type of employment relationship (Tipo Vínculo Empregatício)	It concerns school Temporary / Permanent Contract for teacher	Qualitative Ordinal	Independent
Number Network worked (Número Redes)	It is if the teacher works in the municipal or federal network	Quantitative Discrete	Independent
Number of schools worked (Número Escolas)	Number of schools the teacher works	Quantitative Discrete	Independent
Number of courses taught (Número Turmas)	The number of classes a teacher teaches in schools	Quantitative Discrete	Independent
Number of students em average per class (Número de Alunos por Turma)	The average number of students in the teacher's discipline	Quantitative Discrete	Independent
Number of teachers recruited per teacher (N_matriculas_por_docente)	The average number of teachers recruited in schools	Quantitative Continuous	Independent
Night Class (Turma Nocturna)	See if the teacher works in the afternoon in the schools	Qualitative Binary	Independent
Performance in the Creche (Actuação na Creche)	School offers day care in common classes of regular education	Qualitative Binary	Independent
Performance in Preschool education (Actuação na Pré-Escola)	School offers preschool in common classes of regular education	Qualitative Binary	Independent

Performance in the Elementary School - Early Years (<i>Atuação no Ens. Fundamental Anos Iniciais</i>)	School offers First Years of Elementary School in regular classes	Qualitative Binary	Independent
Performance in the Final Years of the Elementary School (<i>Atuação no Ens. Fundamental Anos Finais</i>)	School offers Final Years of Elementary in regular classes	Qualitative Binary	Independent
Performance in Middle School (<i>Atuação no Ensino Médio</i>)	School offers Middle School in regular classes	Qualitative Binary	Independent
Performance in Youth and Adult Education (<i>Atuação na Educação Jovens e Adultos</i>)	School with Education in common and regular EJA classes	Qualitative Binary	Independent
Performance in Professional Education (<i>Atuação na Educação Profissional</i>)	School with Professional Education in common in regular classes	Qualitative Binary	Independent
Performance in Special Education (<i>Atuação na Educação Especial - Turmas Exclusivas</i>)	School with Special Education for people with physical disabilities	Qualitative Binary	Independent
Schools Characteristics			
Administrative Dependence (<i>Dependência Administrativa</i>)	The Administrative Dependency in which the schools of Goiania are located	Qualitative Ordinal	Independent
Location (Urban / Rural) (<i>Localização (Urbana/Rural)</i>)	The location of the schools	Qualitative Ordinal	Independent
Size of school (<i>Porte Escola</i>)	Number of classrooms in the school for Professors teaches in school	Quantitative Discrete	Independent
Type of teaching unit (<i>Tipo de unidade de Ensino</i>)	Type of teaching unit the teacher works in	Qualitative Ordinal	Independent

Source: Prepared by the author from data of Censo Escolar/INEP 2016 and 2017

2.5 Method of Analysis

An analysis methodology is a process that allows formalizing the steps of development and analysis of the different facts through key variables in order to carry out the research work according to the set objective. This work focuses on the phenomenon of teacher's turnover in Brazil in basic education for the network municipality of Goiania in the State of Goiás with the aim of examining the turnover in public schools managed by the local government. To achieve this objective, we favor the quantitative method for the estimation of the predictors of this so-called turnover in schools (Biondi & Freitas, 2007). The quantitative approach is deductive and is based on the positivism trend. The SPSS software was used for processing and calculating the rate of teacher turnover, and the R software version 4.2.0 for running logistic regression models in the process of analysis of these variables.

Through this approach, descriptive measures will be used first to diagnose the turnover of leavers and mover's teachers in public schools in the network municipality of Goiania. From these descriptive analyses, the average, median, standard deviation, and quartile will be taken into account to evaluate this phenomenon of turnover in schools, and then, a presentation of teachers by gender will be made in relation to the turnover in schools. This descriptive analysis will focus on the annual trend of teacher migration in relation to the difficulties encountered by schools, the rate of turnover in the different administrative departments with schools, and also a comparison of these rates of turnover in the administrative departments with teaching staff (Ingersoll, 2001).

In a second time, a multiple regression models test will be made to see which predictors that are impacted the most by the teachers' turnover leavers and movers in schools. This multivariate analysis will be done using the logistic regression model to study the relationship between a dependent variable in relation to one or more predictors (Greene, 2018). An examination between models of predictors of turnover will be done in relation to teacher conditions and school characteristics (Ingersoll, 2001). The frame 10 above provides the definitions of these variables associated with the sample of schools and teachers. The analysis between these predictors in relation to the dependent variables will be based on this so-called turnover to discuss the results (Guin, 2004). In relation to these analyses, the equation of the multiple logistic regression model is:

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \dots + \beta_k X_{ik} + e_i$$

$$\text{With: } P(Y) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \dots + \beta_k X_{ik})}}$$

Y : Is the Odd log of the Dependent, Explained, Predicted, Return, Response or logit estimate;

X_1, X_2, X_3, X_k : Are called independent variables, Explanatory, Predictors, Repressors, or Control variables;

β_0 : Is the constant or intercept parameter in equation ;

$\beta_1, \beta_2, \beta_3, \beta_k$: Are the logistic regression coefficients (parameter estimates) of the relationship between x and y keeping fixed or other factors in e_i , or which associate with X_1, X_2, X_3, X_k ;

e_i : This is the term error or perturbation of the relationship;

k : Predictor variables, some of which may be interaction terms.

Logistic regression predicts the probability of Y occurring based on known values of X_1 through X_k as predictors (Field et al., 2012). The variable terms "explained or explanatory" are probably the most descriptive (Wooldridge, 1960). Thus, frame 11 shows the compilation of the final set of variables in this study with its descriptions and types.

FRAME 11 – List of variables with identifiers used for the analysis of the regression models

Variables Dependents and Independent (Factors)	Identifier of variables
Variables Dependents	
Rotatividade (<i>General Turnover</i>)	Y1
Saida (<i>Leavers</i>)	Y2
Migração (<i>Movers</i>)	Y3
Teachers Characteristics / Predictor Variables	
Tp_Sexo (<i>Sex_Gender</i>)	U1
Cor_Raca (<i>Race_Color</i>)	U2
Faixa Etária / Idade (<i>Age_Group</i>)	U3
Nível de Formação (<i>Formation_Level</i>)	U4
Teachers Working Conditions / Predictor Variables	
Tipo Vínculo Trabalho (<i>Contract_Type</i>)	U5
Número_Redes (<i>Networks_Number</i>)	U6
Número_Escolas (<i>Schools_Number</i>)	U7
Número_Turmas (<i>Courses_Number</i>)	U8
Número_Total_Matriculadas (<i>Students_Number_Per_Class</i>)	U9
Número_Matricula_Por_Docente (<i>Enrollment_Number_Per_Teacher</i>)	U10
Turma_Nocturna (<i>Night_Class</i>)	U11
Atuação na Creche (<i>Creche_Education</i>)	U12
Atuação na Pré-Escola (<i>PreSchool_Education</i>)	U13
Atuação no Ens. Fundamental Anos Iniciais (<i>First_Years_Fundamental_Education</i>)	U14
Atuação no Ens. Fundamental Anos Finais (<i>Final_Years_Fundamental_Education</i>)	U15
Atuação no Ensino Médio (<i>Middle_Education</i>)	U16
Atuação na Educação Jovens e Adultos (<i>EJA_Education</i>)	U17
Atuação na Educação Profissional (<i>Professional_Education</i>)	U18
Atuação na Educação Especial (<i>Special_Education</i>)	U19
Schools Characteristics / Predictor Variables	
Área da localização (<i>School_Location</i>)	U20
Porte da escola (<i>School_Size</i>)	U21
Tipo Unidade Ensino (<i>Unit_Type</i>)	U22

Source: Prepared by the author from data of Censo Escolar/INEP 2016 and 2017

In relation to this frame the following logistics regressions equations models were created to evaluate the predictors:

(1) Regression Model of General Teachers' Turnover

$$\begin{aligned}
 Y1 = & \beta_0 + \beta_1 U1 + \beta_2 U2 + \beta_3 U3 + \beta_4 U4 + \beta_5 U5 + \beta_6 U6 + \beta_7 U7 + \beta_8 U8 + \beta_9 U9 + \beta_{10} U10 \\
 & + \beta_{11} U11 + \beta_{12} U12 + \beta_{13} U13 + \beta_{14} U14 + \beta_{15} U15 + \beta_{16} U16 + \beta_{17} U17 + \beta_{18} U18 \\
 & + \beta_{19} U19 + \beta_{20} U20 + \beta_{21} U21 + \beta_{22} U22
 \end{aligned}$$

(2) Regression Model of teachers' Leavers

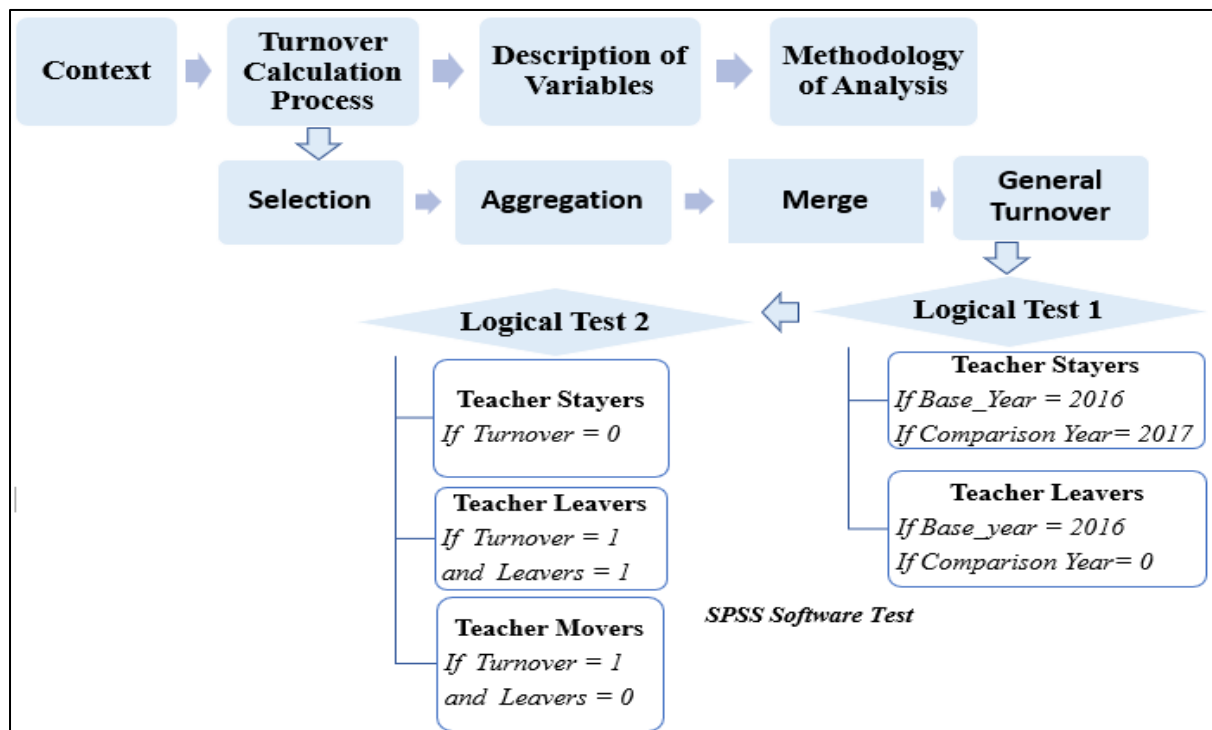
$$Y2 = \beta_0 + \beta_1U1 + \beta_2U2 + \beta_3U3 + \beta_4U4 + \beta_5U5 + \beta_6 U6 + \beta_7U7 + \beta_8U8 + \beta_9U9 + \beta_{10} U10 \\ + \beta_{11}U11 + \beta_{12}U12 + \beta_{13}U13 + \beta_{14} U14 + \beta_{15}U15 + \beta_{16}U16 + \beta_{17}U17 + \beta_{18} U18 \\ + \beta_{19}U19 + \beta_{20}U20 + \beta_{21}U21 + \beta_{22}U22$$

(3) Regression Model of teachers' Movers

$$Y3 = \beta_0 + \beta_1U1 + \beta_2U2 + \beta_3U3 + \beta_4U4 + \beta_5U5 + \beta_6 U6 + \beta_7U7 + \beta_8U8 + \beta_9U9 + \beta_{10} U10 \\ + \beta_{11}U11 + \beta_{12}U12 + \beta_{13}U13 + \beta_{14} U14 + \beta_{15}U15 + \beta_{16}U16 + \beta_{17}U17 + \beta_{18} U18 \\ + \beta_{19}U19 + \beta_{20}U20 + \beta_{21}U21 + \beta_{22}U22$$

Therefore, figure 3 shows the overall modeling of the methodological process that have been described above to better understand this section.

FIGURE 3 – Overall modeling of the methodological process of this work



Source: Prepared by the author (2022)

In resume, this chapter have presented the methodology of work in four parts: first, we presented the context of the study, mentioning the geographical and temporal space selected, as well as the school population in the network municipality of Goiania; second, we have presented the issue of the process of collection, preparation and calculation of data in three steps in which we made choice of secondary source ; thirdly, we have presented the description of the variables while elaborating three tables on the relevant variables of analysis; lastly, presented the method of analysis that is quantitative, descriptive measures were taken into account to evaluate the rate of teachers' turnover, then, a multivariate analysis is prioritized through logistic regression models on the different variables to know the probability of those that explain the teachers turnover. In the following chapter, we presented the analysis of the data and results to answer the fundamental questions posed by this research work.

3 Results and Analysis

Teacher turnover is done in different ways and known as a phenomenon that plagues basic schools in a country. However, it occurs in different ways. In relation to these different forms that it occurs, we cannot ignore its effects on teachers and schools. In addition, the relationships that can exist between these different effects can disrupt the proper functioning of public-school institutions to harm the academic performance of students.

Everything must be regulated and controlled. In relation to the multiple difficulties that teachers face, we have set a general objective, and the path followed was to ensure a theoretical, empirical and methodological basis to support the study aimed at examining the turnover of teachers in public schools of basic education and the factors that explain it.

From now on, this chapter is dedicated to the presentation of the results obtained in relation to the methodology described above and proposes related analyses. To this end, it is organized into three distinct subsections.

The first part presents information on basic education in the network municipality of Goiania through the stages of teaching and the workloads of teachers, aiming to contextualize and understand the organization of basic education in Goiania.

The second part responds to the first specific objective, a general presentation of the rate of turnover of teacher's leavers and movers were made, as well as by the administrative dependence in this first part. The spatial and temporal representation of the research was taken into account. Comparative analyses were made to better understand the facts.

The third part responds to the second specific research objective, and presents the results to analyze the explanatory factors of the teacher turnover in the basic schools of the network municipality of Goiania, through the indicator expressed in the previous chapter through three logistic regression models. The identification of the explanatory factors of the phenomenon was made in the Municipal Education Network of Goiania, which is our universe of analysis spatially through the information on its characteristics and the working conditions of teachers in municipal public education.

Finally, a comparison was made through these models in this chapter, and a potential analysis was made on these predictor variables of teacher turnover with respect to the characteristics of the context where it occurs and the working conditions of teachers.

3.1 Basic Education : Modality Step and Workload of Teachers in Municipal Network of Goiania

This subsection presents the basic education in the network municipality of Goiania through its teaching stages and a framework that compares the career and working conditions of permanent and temporary teachers in the public education system of Goiania.

According to the Organic Law of 1990 of the Network municipality of Goiania, which is a text that was revised and updated until the modification of the Organic Law No. 080, of March 3, 2020 (DOM No. 7.259, of 16-03-2020), subsection II of the stages of modality of education shows that the basic education that is under the control and tutelage of the Municipal Directorate of Education in Goiania is composed of the following stages according to Article 241:

- Early childhood Education;
- Primary or Fundamental Education;
- Middle Education;
- Special Education;
- Youth and Adult Education (Legislativa, 2020, p.81)

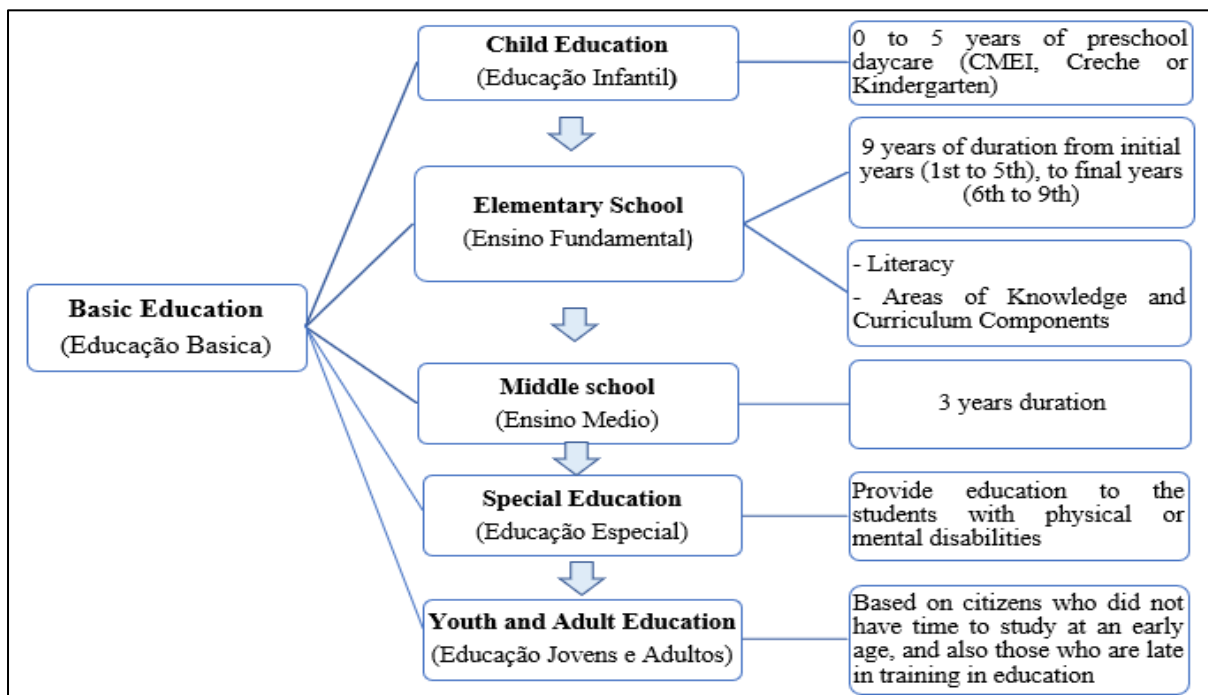
Early childhood education in Goiania is the first stage of basic education and has the function of guaranteeing the integral development of the child in a physical, emotional and intellectual way and the socialization of children from zero to five years old (Legislativa, 2020). It consists of a day care center that includes the 0 to 3 years age group, and a kindergarten for the 4 to 5 years age group. According to the National Curriculum Guidelines for Early Childhood Education/DCNEI, Resolution No. 05 of December 17, 2009 of Article 5, this education must take place in educational spaces, public or private, during the day, part-time, four hours or seven full hours or more, being regulated by the competent body of the educational system and subject to social control (Ferreira, n.d.).

Regarding the education of young people and adults, its objective is to ensure the schooling of the population not served in regular education, promoting their basic education (Legislativa, 2020). As for special education, it aims to provide students with physical or mental disabilities with the necessary prerequisites for their integration into society and the world of work, which is a kind of educational opportunity offered to people with visual, auditory, physical and mental disabilities to learn in Goiania (Legislativa, 2020). The fundamental education of Goiania is composed of literacy and knowledge areas and curriculum components that are focused on a set of disciplines for the initial and final years for the child

(Ferreira, n.d.). It has a duration of nine years and is compulsory for all children from seven years and aims to ensure a basic and common education essential to all (Legislativa, 2020).

In the network municipality of Goiania in the State of Goiás, the primary school bring important considerations on the areas of knowledge (languages, mathematics, natural sciences and humanities) and their respective curricular components (Portuguese language, art, physical education, English language, mathematics, natural sciences, geography and history) that are in dialogue with the general competencies of the BNCC to explain their roles in the integral education of students, taking into account the characteristics, specificities and pedagogical requirements of this stage (Ferreira, n.d.). Figure 4 below shows precisely the modality stages of basic education under the Organic Law of the Municipal Chamber of Goiania.

FIGURE 4 – Basic Education by Teaching Steps in the Municipal Network of Goiania, 2017



Source: Developed by the author (2022)

3.2 Teachers' Turnover in Basic Education : City and Municipal Network of Goiania-2017

This subsection presents the steps taken with the main objective of examining the teachers' turnover in public schools of basic education in Brazil, specifically in the network municipality of Goiânia. From this objective, the secondary objective 1 is derived, which is being analyzed in order to know the rate of turnover of leavers and movers' teachers.

Thus, after a process of approximation with the observed reality, below we have presented in this chapter the results based on the measurement of the phenomenon. However, it should be pointed out that, although the scope of analysis refers to the public sphere, the measurement of the phenomenon does not exclude private administrative dependency for the purposes of comparison and contextualization of the results in a broader context.

Therefore, in this subsection has been divided into five parts. First, a descriptive presentation of the data was made on the teachers' stayers, leavers, and movers; and a presentation by administrative department has been made.

3.2.1 General Teachers' Turnover : City of Goiania

Based on data from the 2016-2017 School Census-Censo-Escolar, this subsection provides information on teacher turnover in basic education in Brazil, specifically in the city of Goiania for all schools. The teachers' turnover is real and it rages within the schools in the city, in relation to this, table 2 presented the number of teachers in basic education in Goiania who left and migrated in the profession. These are teachers who suffered, and who could not continue working in a school and decided to migrate or abandon the teaching profession for other activities either for one reason or another.

Table 2 also showed those who decided to stay in the schools of the city. In relation to this, we can see that the number of teachers in 2016 were 16,007; and of this number 4,583 participated in the movement of turnover (2,376 Movers; 2,207 Leavers), distributed in percentage 28,51%(14,78% Movers; 13,73% Leavers) of the general rate of turnover in the city of Goiania. Then, the other category of teachers was those who were part of staying in schools regardless of the situation, being 11,494 (71,49%) approximately.

TABLE 2 – General Teachers Turnover in the City of Goiania, 2017

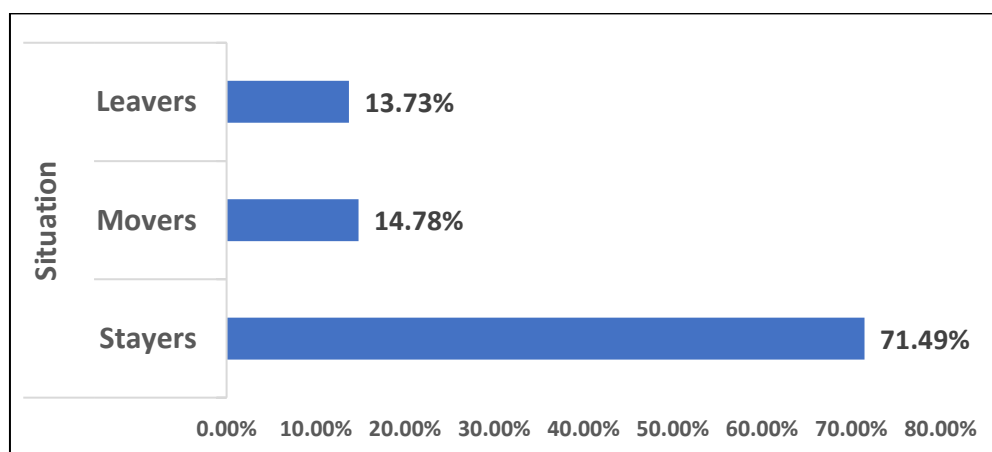
Situation	Teacher's Numbers (2016)	Teachers Turnover			Total	
		No	Yes	Teachers Who Left (2017)	Turnover Rate	
Stayers	11,494	11,494	-		71,49%	28,51%
Movers	2,376	-	2,376	2,376	14,78%	
Leavers	2,207	-	2,207	2,207	13,73%	
Total	16,077	11,494	4,583	4,583	100%	

Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)

To elaborate, Graph 1 below showed that the rate of teacher turnover in the city of Goiânia in 2017 in percentage was 28,51%. Then, we found that the phenomenon of teacher turnover was divided in terms of those who remained in the profession, those who migrated to other schools, and those who left the schools .

Graph 1 shows statistically that in all schools in the city of Goiania, either public or private that 14,78% of teachers changed schools (movers); then, 13,73% changed profession, or assumed other function in the educational network by leaving the classroom during the period from 2016 to 2017, in general the rate of 28,51% of teachers' turnover in the city. We can also see that through the available data that the rate of Movers teachers in the profession is slightly higher than those who left teaching . The same graph showed statistically that the rate of teachers who remained in schools on the positive side of the turnover phenomenon was 71,49%.

GRAPHI 1 – General Teachers Turnover in the City of Goiania, 2017



Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)

Then, starting from the rate of turnover (28,51%) presented in graph 1 for the whole of the schools of Goiania city (both public and private), we measured this rate in the administrative dependence to find the general rate for the network municipality of Goiania where are located the public schools in basic education. From this, the table 3 below showed the distribution of this rate to have a clearer idea about the situation in the different departments in the city of Goiania in the following subsection 3.2.2.

3.2.2 Teachers' Turnover in Administrative Dependency : City of Goiania

The measurement of the phenomenon of teacher turnover at the level of public and private administrative dependency is taken in charge for the purpose of comparison and contextualization of the results in a wider context. Thus, the presentation of the results begins with the publication of the general turnover rate obtained for the city of Goiânia, which was distributed in the administrative dependency. The figures presented between the total number of teachers in 2016 compared to the number of turnovers in 2017 are systematized in Table 3. The results obtained from this first effort aim to explain the behavior of teachers in the phenomenon of turnover in the municipality of Goiânia.

Thus, looking at Table 3 above, the figures showed statistically that the general teacher turnover rate found was based on the rate found in the city of Goiânia (28,51%) for all public or private schools (see Table 2).

Based on the results of table 3 below, we found that this same rate (28,51%) turnover for the city of Goiânia in 2017, was distributed according to administrative department in the state network had a higher rate overall (40,27%), followed by the federal sphere (32,88%), then comes the private network (27,25%), and finally the municipal public network (23,17%). Hence, our target rate was found for the network municipality of Goiania for the basic public schools Thus, from this rate (23,17%), we showed in sub-section 3.2.3 the distribution of teachers who migrated from public schools in the network municipality of Goiania.

TABLE 3 – Teachers Turnover rate by Administrative Dependence in City of Goiania, 2017

Administrative Dependence	Teachers' number in schools (2016)	Turnover Situation			Total	
		Stayers	Movers	Leavers	Teachers' number who left schools (2017)	Turnover Rate
Federal	368	247	18	103	121	32.88%
Estadual	3164	1890	706	568	1274	40.27%
Municipal	5629	4325	799	505	1304	23.17%
Private	6914	5030	853	1031	1884	27.25%
Total	16,075	11,492	2,376	2,207	4,583	28.51%

Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)

Although the rate (28,51%) analyzed in the administrative department of Goiânia is lower than the general rate of turnover found by Edmilson and Dalila (2018) for Brazil in 2012, that is, 38,0% of the total number of teachers who started working in the schools, and then, stopped being in the same school the following year, which was considered a worrying situation (Pereira & Oliveira, 2018), our turnover rate (28,51%) is somewhat as high, without forgetting to mention the rate of municipal basic schools in Goiania during the year 2017.

In terms of results in the North American context, Ingersoll (2001) showed that the general turnover rate was 13,2% (7,2% Movers; 6,0% Attrition), the private sphere had a higher overall rate of teacher turnover (22,8%) in schools than public schools (14,4%) in the United States (Ingersoll, 2001); compared to the rate of teacher turnover in Goiânia in the private sphere for the administrative department, the same is also true of our result in the administrative dependency of Goiania, since, the private sphere (27,25%) exceeds the rate of the municipal sphere (23,17%).

As for the 14,4% turnover rate presented by Ingersoll in public schools (Ingersoll, 2001), compared to the municipal rate (23,17%) presented in our research work also for public schools, our rate differs from Ingersoll's rate in his study on turnover in the United States in the public sphere, because, our rate is higher for the scenario studied in Goiânia either in the city or at the municipal level.

Another aspect, in the national situation of Brazil in relation to this phenomenon, Edmilson and Dalila (2018) presented us the rate of turnover of Brazilian teachers that includes all the teachers leaving in this period for different reasons (retirement, health reason, abandonment of the profession, leaves, change of school), and in absolute number, this rate is equivalent to 265,943 teachers is equivalent to 23,0% in total (Pereira & Oliveira, 2018, p.739).

Comparing the results of Edmilson and Dalila to the number of teachers who left the profession in the city as a whole, and also the network municipality of Goiânia in particular in our study based on the year 2017, we found for the city, that the number of teachers was 4,583 corresponding to the rate of 28,51%; then, in the network municipality of Goiania at the level of public schools, we obtained a number of 1,304 teachers corresponding to the rate of 23,17%. The two rates compared for two different periods, that is, those analyzed in our study period parallel to those shown by Edmilson and Dalila (23,0%) in their study results for Brazil are similar corresponding to the rate presented for the network municipality of Goiania during our study (23,17%), however, the rate presented for the city of Goiania (28,51%) greatly exceeds the results found by Edmilson and Dalila in the year 2018.

Regarding the results of our study, analyzing the general rate of turnover (28,51%) presented in Table 3, along with its specific rates for each sphere in the administrative department, we cannot go unnoticed in a more specific and detailed way on the rate of public basic schools in the network municipality of Goiania. In this sense, a representation and analysis were carried on these schools in the network municipality, and identified the teachers who migrated and left public schools in the network municipality following the same results presented in section 2.3.1 on all schools in the city of Goiânia.

So far, in the study and analysis of teacher turnover, we have presented the phenomenon on all schools in the city of Goiania (both public and private). We measured this rate (28,51%) in the administrative dependency to find the general rate for the network municipality of Goiania where are located the public schools in basic education. The table 3 above praised the distribution of this rate to have a clearer idea about the situation in the different departments in the city of Goiania in the following subsection 3.2.1 above. And we had the turnover rate for the network municipality (23,17%) of Goiania for all public schools in basic education. From this, we used and distributed this rate in section 3.2.3 to present the teachers who migrated and left the schools in the network municipality.

3.2.3 Teachers' Turnover in Public Schools : Municipal Network of Goiania

In this subsection, the results on the number of teachers who migrated and left the public schools in basic education were presented more specifically for the network municipality of Goiania. Indeed, the previous results were more extensive, as they were based on the city of Goiania including all its schools, both public and private. From there, this subsection presents the results targeted by our research question in the public schools in the municipal network of Goiania. Still based on the data of the school census-Censo-Escolar of 2016-2017, this subsection provides the results of the phenomenon of teacher turnover in basic education in public schools, specifically in the network municipality of Goiania.

Based on the results of Table 4, the Brazilian public schools in the network municipality of Goiania had a workforce of 1,304 teachers who participated in the turnover phenomenon in 2017. They were 5,629 teachers working in these schools in 2016, and then, they decided to abandon afterwards. In relation to this, Table 4 presented the number of teachers in public schools in basic education in the network municipality of Goiania with an effective turnover rate of 23,17%.

During the year 2017, the number of 1,304 (799 Movers; 505 Leavers) teachers was distributed in a rate of 23,17% (14,19% Movers; 8,87% Leavers). Then, the other category of teachers is part of those who remained in schools despite the situations they have been, a rate of 76,83%. All these results showed us that the phenomenon of turnover is ravaging public schools and impacting the educational system as a whole.

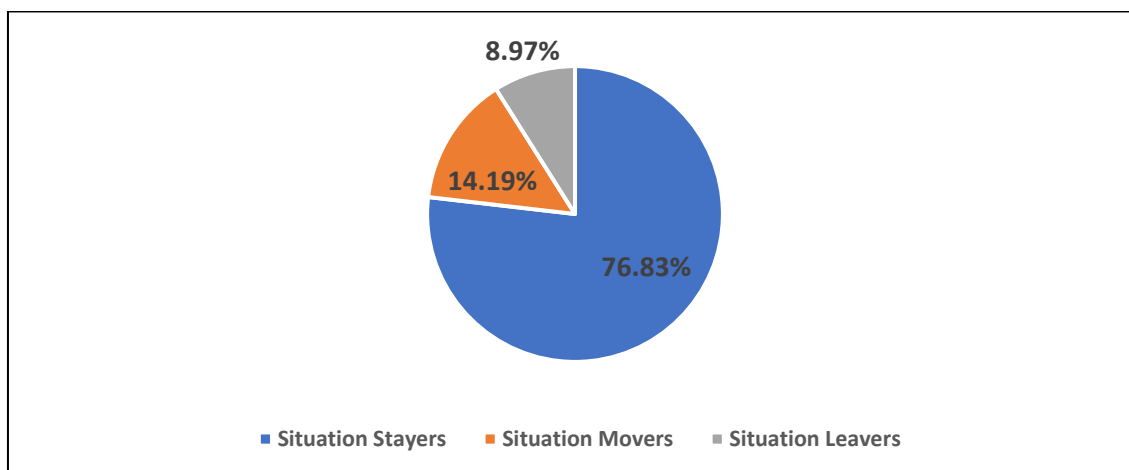
TABLE 4 – Teachers Turnover in Public Schools in the Municipal Network of Goiania, 2017

Situation	Teacher's Numbers (2016)	No	Yes	Teachers Who Left (2017)	Turnover Rate	
Stayers	4,325	4,325	-		76,83%	
Movers	799	-	799	799	14,19%	23,17%
Leavers	505	-	505	505	8,97%	
Total	5,629	4,325	1,304	1,304	100%	

Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)

Graph 2 also showed in a similar way that Table 4 that in the whole public network, statistically that out of 23,17% of teachers were in the phenomenon of turnover in the network municipality, 14,19% changed schools (movers); then, 8,97% abandoned the profession, or assumed other function in the educational network by leaving the classroom during the period from 2016 to 2017. Indeed, we found through the results on public schools in the network municipality of Goiania that the rate of Movers teachers is higher than those who left teaching. We also found through the same graph that statistically the rate of turnover of teachers who remained in public schools is lower in the phenomenon of turnover, that is, 8,97%.

GRAPH 2 – Teachers Turnover in Public Schools in the Municipal Network of Goiania, 2017



Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)

At the level of international literature in the North American context, Darling Harmong and Carver Thomas (2019) showed that the global sphere of teacher turnover rate which was about 16,0% in 2013 (Carver-Thomas & Darling-Hammond, 2019), compared to 23,17% for our case study in Brazil in the network municipality of Goiania according to table 4. These teachers who both moved and left the profession voluntarily or involuntarily, are leaving for retirement or other pre-retirement reasons (Carver-Thomas & Darling-Hammond, 2019). In addition, of the 16,0% turnover that Darling Harmong and Carver Thomas showed us in the United States, 37,0% of teachers migrated voluntarily, 18,0% retired, 30,0% left schools voluntarily in the form of pre-retirement, and 14,0% left voluntarily (Carver-Thomas & Darling-Hammond, 2019).

Comparing the results presented by Carver-Thomas & Darling-Hammond on the phenomenon of turnover with the results of our study in the network municipality of Goiania in basic education, the global rate of turnover (23,17%) distributed by teachers who migrated (14,19%) and left (8,97%) in the public schools as presented in graph 2, it is higher than those presented by the authors (16,0%). Unlike in the distribution of the overall rate by teachers who migrated and left the schools in the network municipality of Goiania, the rates found in the distribution of the authors are higher than those presented for our scenario studied.

Presenting this scenario of turnover in the network municipality of Goiânia, the challenge that is imposed for the managers in the basic educational system is the management of those teachers who migrate to other districts and also those who leave in public schools. All this also imposes an effective public education policy that will be based on results to manage and stabilize the remaining teachers. Although the context and the work on which it focuses, the effects and the ways of measuring the phenomenon are different when analyzing the facts, such a comparison allows us to situate the results found in a broader scenario.

All this proves statistically that the phenomenon of teacher turnover in Brazil is real, and is an alarm bell that must be heeded by educational managers before it is too late. An identified problem is half solved, and in order to have effective results, it is necessary to apply effective public educational policies in order to stop this phenomenon. Buarque (2007) tells us that without an educational policy that takes into account our students and teachers, the Brazilian society will suffer a phenomenon of de-education that will have harmful consequences on the evolution of the society (Buarque, 2007).

3.2.4 Number and Characteristics of Teachers in Public Schools in the Municipal Network of Goiania

This subsection presented the distribution of teachers by personal characteristics, workload in classes and by modality stage at the level in public schools of basic education in the network municipality of Goiania. This distribution was done in terms of percentage in the different tables.

Table 5 below presents the data on the characteristics of teachers in public schools within the basic education in the network municipality of Goiania. All the scenarios were distributed in relation to the response variables according to the characteristics of the teachers by gender, age group, level of education and by color and race in the municipal schools of Goiania.

On a total of 5,629 teachers, we found that in terms of gender of teachers, women were the highest 4,910 (87%) working in public schools, compared to 719 (12,8%) for men. By age group, teachers aged between 36 and 45 years (35,8%) were the most numerous in the network municipality to teach, while those under 25 years (0,2%) had the lowest rate.

Then, by color and race, white teachers were the most numerous (40,2%), while indigenous teachers (0,1%) were the least. Finally, by level of training, teachers with a bachelor's degree (44,7%), and those without a bachelor's degree (42,2%) in teaching were the two categories with the highest number of teachers in public schools in the network municipality of Goiania. It is worth mentioning that the schools had the highest rate of teachers who had a Bachelor's degree in basic education, that is, those who have a qualification level in teaching.

TABLE 5 – Teachers Characteristics in Publics Schools in the Municipal Network of Goiania, 2017

Variables		Frequency	
		N	%
Number Total of Teachers		5,629	100.0
Sex_Gender	Male	719	12.8
	Female	4,910	87.2
Age_Group	<= 25	11	0.2
	26 - 35	1,339	23.8
	36 - 45	2,014	35.8
	46 - 55	1,685	29.9
	56+	580	10.3
Race_Color	Not Declared	1,117	19.8
	White	2,261	40.2
	Black	2,245	39.9
	Indigenous	6	0.1
Formation_Level	Elementary or Middle School	73	1.3
	Middle with Teaching	119	2.1
	Higher Education without Degree	395	7.0
	Higher Education with Degree	2,515	44.7
	Specialization	2,378	42.2
	Master's or Doctorate Degree	147	2.6
	Not identified	2	0.0
			100

Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)

In table 6, we could see that on 5,629 teachers working in the municipal network by level of education, 53,6% of these teachers were assigned to the basic education of the initial years with a higher rate in the network municipality, followed by those who worked in the basic education of the final years with a rate of 37,9%. It is worth mentioning that the rate of teachers who worked in the level of vocational education (0,2%) and exclusive education (1,5%) were the lowest. For the number of stages, those who belong to the first two categories whose numbers are one (56,4%) and two (35,3%) were the highest. Regarding the availability of these teachers to work in public schools in the network municipality during the afternoon, we found that 11,0% were assigned to teach in the afternoon.

As for the last line of the table, it refers to teachers who have obtained some type of employment contract in the network municipality. Now, a work contract is a legal act that maintains a relationship between an employer and an employee defining the work conditions containing the duration, place, salary and other administrative conditions (Goldstein, 2022). In the Brazilian basic education system in the public schools in the municipal network of Goiania, there is the existence of the permanent contract and temporary contract that regulates the working conditions of the teachers in basic education. Thus, table 6 shows the rate of teachers with temporary and stable work contracts, in relation to which we could see that 90,3% of these teachers had a stable work contract with the highest rate in the network municipality within the basic education, against 9,7% of teachers with a temporary contract.

TABLE 6 – Teachers Working Conditions in schools in Publics Schools in the Municipal Network of Goiania, 2017

Variables	Categories	Frequency	
		N	%
Number Total of Teachers		5,629	100.0
Stage/Modality in which it operates	Creche	986	17.5
	Pre-School	1,073	19.1
	EF-1	3,018	53.6
	EF-2	2,135	37.9
	EM	277	4.9
	EJA	916	16.3
	EP	12	.2
	EE (exclusive)	83	1.5
Number of Steps	1	3,177	56.4
	2	1,989	35.3
	3	378	6.7
	> 3	50	0.9
	Not identified	35	0.6
Night Classes	Yes	621	11.0
Contract Type	Statutory / Permanent / Stable	5,082	90,3
	Temporary Contract	547	9.7
			100

Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)

Table 7 presented the number of teachers who have workloads in public schools in the network municipality of Goiania. We found that out of 5,629 teachers who were assigned to workloads in public schools, the category of the first group had 62,8% of teachers as the majority who worked in schools, against 0,83% of teachers in the category below three with the lowest rate. In terms of the number of networks that teachers were assigned, the first

network category had the highest rate (88,2%), compared to the third category with the lowest rate (0,3%).

Within the classrooms, the first two categories had the number of teachers with the highest number of classes to teach in these public schools, that is 30,8% in the first category, and 18,4% in the second, then the other categories had a lower number of students. Regarding the number of students in the classrooms of these teachers, it should be noted that the highest number of students is found in two categories: between 21-25 (30,9%) high per class and 26-30 (30,6%) high in the classrooms in public schools under the direction of these teachers.

Finally, the highest rate of recruitment of teachers in public schools was 45,6%, that is, teachers in the category with a number less than or equal to 50 (≤ 50). Those in the 201-250 category had a lower recruitment rate (6,0%) than the others.

TABLE 7 – Teachers Workload in Public Schools in the Municipal Network of Goiania, 2017

Variables	Categories	Frequency	
		N	%
Number Total of Teachers		5,629	100.0
Number of Schools that works	1	3,536	62.8
	2	1,795	31.9
	3	251	4.5
	> 3	47	.83
Number of Networks	1	4,962	88.2
	2	652	11.6
	3	15	.3
Teacher's number of Courses	1	1,731	30.8
	2	1,033	18.4
	3	245	4.4
	4	402	7.1
	5	405	7.2
	6	375	6.7
	7	274	4.9
	8	180	3.2
	9	144	2.6
	10	150	2.7
Number of students per Class	<= 15	510	9.1
	16 - 20	983	17.5
	21 - 25	1,739	30.9
	26 - 30	1,720	30.6
	> 30	677	12.0
Number of enrollments per teacher	<= 50	2,567	45.6
	51 - 100	678	12.0
	101 - 150	726	12.9
	151 - 200	522	9.3
	201 - 250	337	6.0
	> 250	799	14.2

Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)

Table 8 in its structure presented the characteristics of the schools through their location, the type of teaching unit, and the number of classes that these public schools contain in terms of space and number. We can see in the network municipality that the majority of public schools are located in the urban area with 99,7%. The types of units the CMEI are the lowest with a rate of 23,7%, on the other hand, the public schools of level of education were the highest than the CMEI with a rate of 76,3%. Then, these public schools in the network municipality had a large number of classes through the groups 401-550 (23,0%) and 551-700 (21,0%) to receive students and teachers to work.

TABLE 8 – Publics Schools Characteristics in the Municipal Network of Goiania, 2017

Variables	Categories	Frequency	
		N	%
Number Total of Teachers		5,629	100.0
Location	Urban	5,611	99.7
	Rural	18	0.3
Unit Type	Municipal Center for Early Childhood Education (CMEI)	1,333	23.7
	SCHOOL	4,296	76.3
School Size	<= 100	481	8.5
	101 - 250	1,104	19.6
	251 - 400	752	13.4
	401 - 550	1,297	23.0
	551 - 700	1,184	21.0
	> 700	811	14.4
			100

Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)

3.2.5 Teachers' Turnover : Characteristics of Teachers and Schools in the Municipal Network of Goiania

This subsection presented in number and percentage of teachers who both migrated and left the teaching profession in the public schools of the network municipality of Goiania in basic education by characteristic, the different working conditions, namely workload and number of students in their classrooms, their types of work contract and other interesting aspects. For this purpose, four tables were presented to evaluate and analyze the situation in basic education.

Table 9 presented data on the characteristics of teachers who migrated and left the teaching profession in public schools within the basic education in the network municipality of Goiania during the turnover phenomenon in 2017. On a total of 5,629 teachers who worked in these public schools, we were able to see that in terms of gender of teachers, the percentage of men were the highest (24,1%) to leave the profession in public schools, compared to 23,0% for women in the general turnover. In addition, the data showed that in terms of migration and departure, the turnover rates of male teachers were (16,0% Movers; 8,1% Leavers), compared to (13,9% Movers; 9,1% Leavers) for female teachers. Thus, male teachers were more likely to participate in the phenomenon of turnover, migration or leave than female teachers.

By age group, we also note that teachers under 25 years have been the most numerous in the network municipality to participate in the phenomenon of turnover with a rate of 63,6% (18,2% Movers; 45,5% Leavers), then come the teachers aged between 26-35 years with a rate of 24,9% (17,3% Movers; 7,6% Leavers), and then, the others have been slightly lower.

Then, in terms of color and race, indigenous teachers were the most numerous to participate in the turnover with a rate of 33,3% (33,3% Movers; 0% Leavers), but there was no total abandonment, only teachers who migrated to other schools. As for the other cases, all the other teachers of the other colors were among the teachers who both moved and left the profession. It should be noted that the teachers with the lowest rate in the phenomenon were those who were not declared with a rate of 19,69% (11,1% Movers; 8,8% Leavers).

Finally, by level of training, teachers whose qualifications were not identified were the most numerous to participate in the turnover with a rate of 50,0% (0% Movers; 50,0% Leavers), but there was total abandonment of these teachers, they could not remain in the educational system. Then, in second position comes the teachers who have a level of training in basic and middle education through a turnover rate of 45,2% (16,4% Movers; 28,8% Leavers), on the other hand, the other teachers with a level of qualification to teach had almost the same rate of departure in teaching in public schools in the network municipality of Goiania.

TABLE 9 – Turnover rate by Teachers Characteristics in Publics Schools in the Municipal Network of Goiania, 2017

Variables		Frequency	Situation			
		N	Stayers	Movers	Leavers	Turnover
Number Total of Teachers		5,629	76.8%	14.2%	9.0%	23.2%
Sex_Gender	Male	719	75.9%	16.0%	8.1%	24.1%
	Female	4,910	77.0%	13.9%	9.1%	23.0%
Age_Group	<= 25	11	36.4%	18.2%	45.5%	63.6%
	26 - 35	1,339	75.1%	17.3%	7.6%	24.9%
	36 - 45	2,014	76.8%	15.1%	8.1%	23.2%
	46 - 55	1,685	78.9%	11.9%	9.2%	21.1%
	56+	580	75.9%	10.5%	13.6%	24.1%
Race_Color	Not Declared	1,117	80.1%	11.1%	8.8%	19.9%
	White	2,261	76.1%	15.3%	8.7%	23.9%
	Black	2,245	76.0%	14.6%	9.4%	24.0%
	Indigenous	6	66.7%	33.3%	0.0%	33.3%
Formation_Level	Elementary or Middle School	73	54.8%	16.4%	28.8%	45.2%
	Middle with Teaching	119	76.5%	11.8%	11.8%	23.5%
	Higher Education without Degree	395	76.5%	11.6%	11.9%	23.5%
	Higher Education with Degree	2,515	75.8%	15.6%	8.5%	24.2%
	Specialization	2,378	78.7%	13.1%	8.2%	21.3%
	Master's or Doctorate Degree	147	76.2%	15.6%	8.2%	23.8%
	Not identified	2	50.0%	0.0%	50.0%	50.0%
						100.0%

Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)

Table 10 below presents the different working conditions of teachers in the phenomenon of teacher turnover in Brazilian basic education, starting with the education according to learning levels and ending with the type of work contract.

We could see that out of a total of 5,629 teachers who were in public schools in the network municipality by level of education, the teachers who were part of the nursery school (Creche) were the most numerous to participate in the turnover phenomenon, 28,5% (19,0% Movers; 9,5% Leavers). The second largest group of teachers were those who worked in pre-education in basic education, 27,2% (16,5% Movers; 10,7% Leavers). However, the teachers who were the least to leave the public schools in this level were in middle education with a rate of 14,8% (14,1% Movers; 0,7% Leavers). It is worth mentioning that, although the general turnover rate of the nursery teachers was the highest, in a more specific case, the teachers who were part of the pre-education level were the most likely to leave the profession, that is to say, 10,5% of permanent abandonment, against 9,5% of the departure rate of the creche teachers.

In terms of the number of steps, those who were part of the unidentified teachers were the most numerous to participate in the phenomenon of turnover in the public schools of the network municipality of Goiania, 34,3% (14,3% Movers; 20,0% Leavers). Then comes the teachers whose category numbers that were greater than three were the most numerous, 24,0% (24,0% Movers; 0,0% Leavers). It means that there were no teachers who left the profession in the category of teachers who were in the teaching stage, all the teachers only moved to other schools, and these schools can be in the same district where the teachers are or in different districts.

Regarding the rate and availability of teachers who worked in the afternoon in public schools in the network municipality, we found that only 20,1% (16,1% Movers; 4,0% Leavers) were involved in the phenomenon of turnover, on the other hand, those teachers who were assigned in schools to work in the afternoon were the most to migrate instead of abandoning the profession.

Also in table 10, the number of teachers by type of employment contract who participated most in the turnover phenomenon were those with a temporary employment contract, 58,3% (28,5% Movers; 29,8% Leavers) against 19,4% (12,7% Movers; 6,07 Leavers) of those with a permanent and stable employment contract. It is worth mentioning that those with a temporary contract had a higher rate of departure (29,8%) than those who moved (28,5%) in the profession, while the opposite is true for the teachers with a stable contract who were in the phenomenon of turnover, that is to say, a lower rate of departure (6,07%) than those who moved (12,7%) in public schools in the network municipality within the basic education. Therefore, the teachers with temporary contracts are the most numerous to participate in the general phenomenon of turnover, and were also the most numerous to leave the profession than those who migrated during the same period, in contrast to the teachers who had a stable contract who had a lower general rate of turnover, and who were the least to migrate in the profession instead of making permanent abandonment.

TABLE 10 – Turnover rate by Teachers Working Conditions in Public Schools in the Municipal Network of Goiania, 2017

Variables	Categories	Frequency	Situation			
		N	Stayers	Movers	Leavers	Turnover
Number Total of Teachers		5,629	76.8%	14.2%	9.0%	23.2%
Stage/Modality in which it operates	Creche	986	71.5%	19.0%	9.5%	28.5%
	Pre-School	1,073	72.8%	16.5%	10.7%	27.2%
	EF-1	3,018	78.0%	13.9%	8.2%	22.0%
	EF-2	2,135	78.5%	15.2%	6.3%	21.5%
	EM	277	85.2%	14.1%	0.7%	14.8%
	EJA	916	79.3%	17.0%	3.7%	20.7%
	EP	12	83.3%	16.7%	0.0%	16.7%
	EE (exclusive)	83	78.3%	10.8%	10.8%	21.7%
Number of Steps	1	3,177	76.7%	11.6%	11.6%	23.3%
	2	1,989	76.7%	17.3%	6.0%	23.3%
	3	378	79.6%	18.0%	2.4%	20.4%
	> 3	50	76.0%	24.0%	0.0%	24.0%
	Not identified	35	65.7%	14.3%	20.0%	34.3%
Night Classes	Yes	621	79.9%	16.1%	4.0%	20.1%
Contract Type	Statutory / Permanent / Stable	5,082	80.6%	12.7%	6.7%	19.4%
	Temporary Contract	547	41.7%	28.5%	29.8%	58.3%
						100.0%

Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)

Table 11 below presents the different conditions and workloads of teachers in classrooms in the phenomenon of turnover in public schools within the Brazilian basic education, starting with the number of schools that these teachers worked for ending with the number of recruitment of teachers in these schools in the network municipality.

We found that out of the number of schools that these teachers worked, the third category had a higher turnover rate than the others, that is 32,7% (31,5% Movers; 1,2% Leavers), then comes the second category with a rate of 25,0% (21,6% Movers; 3,4% Leavers), but, the slightly lower turnover rate was found in the first category, that is 21,5% (9,1% Movers; 12,5% Leavers). Thus, we can say that out of the number of schools that these teachers worked in, the phenomenon of turnover was most evident in the third category, both at the general and specific level, compared to the other categories.

In terms of the number of networks that teachers have assigned to themselves, the first network category had the highest rate, 23,8% (14,0% Movers; 9,8% Leavers), compared to 18,3% (15,6% Movers; 2,6% Leavers) of the second category which had the lowest rate. It should be noted that the second category had the highest rate (15,6%) of teachers who moved to other schools compared to the first category with a lower migration rate (14,0%). On the other hand, the first category had the highest rate of permanent departure (9,8%) in the turnover phenomenon compared to the second category (2,6%) in public schools.































Regarding the situation of turnover on the number of courses that the professors give in the classrooms, the professors belonging to the third category were the most numerous in the phenomenon of turnover, i.e., 26,1% (16,3% Movers; 9,8% Leavers), followed by the seventh category with a turnover rate of 25,2% (16,4% Movers; 8,8% Leavers). On the other hand, we found that the eighth category had the lowest overall turnover rate, at 18,2% (14,4% Movers; 3,9% Leavers). Among these teachers who have a number of courses to teach in these schools, the first category leads the list in terms of teachers who have moved or left the schools compared to the other categories compared in the work, and so on.

Regarding the number of students who are available in the classrooms of these teachers, it should be noted that the general turnover was the highest was found in the classrooms of teachers who had between 21-25 students, that is, a turnover of 25,8% (15,9% Movers; 9,9% Leavers); then, comes in second place the highest turnover rate due to the number of teachers who had 16-20 students in their classrooms, that is, a turnover of 24,5% (14,4% Movers; 10,1% Leavers). The lowest turnover rate was seen in classrooms with more than 30 students, at 19,8% (12,4% Movers; 7,4% Leavers). Although classrooms with 21-25 students had a higher overall turnover rate (25,8%), they had a slightly lower number of permanent teacher departures (9,9%) compared to classrooms with 16-20 students, or 10,1% in the public-school classrooms where these teachers worked before participating in the turnover phenomenon.

Lastly, the highest overall turnover among teachers who were recruited to work in public schools was 25,0% (13,3% Movers; 11,7% Leavers), i.e., teachers who were in the category of less than or equal to 50 (≤ 50). Next came those in the 201-250 category with a turnover rate of 23,4% (19,9% Movers; 3,6% Leavers), and then the other categories had almost equal turnover rates. Although the category of recruited professors, from the side of professors with less than or equal to 50, had the highest overall turnover rate (25,0%), on the other hand, it had the lowest rate of professors (13,3%) who migrated in the profession compared to the category in 201-250, i.e., 19,9%. On the other hand, regarding the permanent departure, the category of professors whose numbers were less than or equal to 50 was the highest (11,7%),

compared to 3,6% of the category with 201-250 recruited professors. Thus, the category of teachers recruited who are less than or equal to 50, and were the least to migrate, but, were the most to leave the public schools in the network municipality of Goiania.

TABLE 11 – Turnover rate by Teachers Workload in Class in the Municipal Network of Goiania, 2017

Variables	Categories	Frequency	Situation			
		N	Stayers	Movers	Leavers	Turnover
Number Total of Teachers		5,629	76.8%	14.2%	9.0%	 23.2%
Number of Schools that works	1	3,536	78.5%	9.1%	12.5%	 21.5%
	2	1,795	75.0%	21.6%	3.4%	 25.0%
	3	251	67.3%	31.5%	1.2%	 32.7%
	> 3	47	76.6%	23.4%	0.0%	 23.4%
Number of Networks	1	4,962	76.2%	14.0%	9.8%	 23.8%
	2	652	81.7%	15.6%	2.6%	 18.3%
	3	15	80.0%	20.0%	0.0%	 20.0%
Teacher's number of Courses	1	1,731	75.4%	10.2%	14.3%	 24.6%
	2	1,033	76.0%	18.2%	5.8%	 24.0%
	3	245	73.9%	16.3%	9.8%	 26.1%
	4	402	77.1%	12.2%	10.7%	 22.9%
	5	405	77.8%	10.1%	12.1%	 22.2%
	6	375	80.5%	11.2%	8.3%	 19.5%
	7	274	74.8%	16.4%	8.8%	 25.2%
	8	180	81.7%	14.4%	3.9%	 18.3%
	9	144	79.2%	18.8%	2.1%	 20.8%
	10	150	76.0%	22.7%	1.3%	 24.0%
Number of students per Class	<= 15	510	77.3%	12.4%	10.4%	 22.7%
	16 - 20	983	75.5%	14.4%	10.1%	 24.5%
	21 - 25	1,739	74.2%	15.9%	9.9%	 25.8%
	26 - 30	1,720	78.8%	13.6%	7.6%	 21.2%
	> 30	677	80.2%	12.4%	7.4%	 19.8%
Number of enrollments per teacher	<= 50	2,567	75.0%	13.3%	11.7%	 25.0%
	51 - 100	678	77.9%	14.5%	7.7%	 22.1%
	101 - 150	726	77.7%	11.0%	11.3%	 22.3%
	151 - 200	522	79.3%	13.0%	7.7%	 20.7%
	201 - 250	337	76.6%	19.9%	3.6%	 23.4%
	> 250	799	79.5%	18.1%	2.4%	 20.5%
						 100.0%

Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)

As for Table 12, it presented the characteristics of the schools that had the turnover of teachers by location, type of teaching unit and the number of classes that these public schools contain in terms of space and number. We found in the network municipality of Goiania that the majority of public schools that were in the phenomenon of turnover were located in the urban area, 23,2% (14,4% Movers; 8,9% Leavers) against those of schools placed in rural areas with a rate of 22,2% (5,6% Movers; 16,7% Leavers). Although urban schools had the highest number of teachers who participated in the general turnover (23,2%), but, in terms of permanent departures of their teachers, these schools had a low rate (8,9%) of teachers (8,9%), unlike rural schools with a higher permanent departure rate (16,7%). On the other hand, urban schools have the highest rate (14,4%) of teachers who have migrated in the profession than schools placed in rural areas (5,6%).

At the level of unit type schools, CMEI was the most affected by the phenomenon of turnover, since 29,2% (17,9% Movers; 11,3% Leavers) of their teachers were in the phenomenon of turnover, compared to the other schools of the municipal network that had the lowest rate, that is 21,23% (13,0% Movers; 8,3% Leavers). It must be said that although there is a difference in the rates, but they all have a level of turnover almost of the same level.

Lastly, the public schools in the municipal network that have a number of classes less than or equal to 100 were most affected by the number of teachers was in the phenomenon of turnover, being 30,1% (16,6% Movers; 13,5% Leavers); then, come the schools with the number of classes lying between 101-250, with a rate of 25,5% (15,9% Movers; 9,7% Leavers). On the other hand, the schools with the space between 401-550 were the least affected by the phenomenon of teacher turnover in the network municipality of Goiania with a rate of 18,7% (11,1% Movers; 7,6% Leavers).

TABLE 12 – Turnover rate by Public Schools Characteristics in the Municipal Network of Goiania, 2017

Variables	Categories	Frequency	Situation			
		N	Stayers	Movers	Leavers	Turnover
Number Total of Teachers		5,629	76.8%	14.2%	9.0%	23.2%
Location	Urban	5,611	76.8%	14.2%	8.9%	23.2%
	Rural	18	77.8%	5.6%	16.7%	22.2%
Unit Type	Municipal Center for Early Childhood Education (CMEI)	1,333	70.8%	17.9%	11.3%	29.2%
	SCHOOL	4,296	78.7%	13.0%	8.3%	21.3%
School Size	<= 100	481	69.9%	16.6%	13.5%	30.1%
	101 - 250	1,104	74.5%	15.9%	9.7%	25.5%
	251 - 400	752	78.5%	13.8%	7.7%	21.5%
	401 - 550	1,297	81.3%	11.1%	7.6%	18.7%
	551 - 700	1,184	77.1%	14.1%	8.8%	22.9%
	> 700	811	75.2%	15.9%	8.9%	24.8%
					100.0%	

Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)

So, in all the tables presented so far, we could see that both in the characteristics of teachers and schools, and in the working conditions in the classrooms of public schools, all aspects were affected in basic education by teachers who migrated to other schools and left the profession to pursue other activities. The phenomenon of turnover was shown at the level of the city, the administrative dependency, and at the level of the network municipality of Goiania, which was the most focused in the section. The teachers who worked in the public schools of Goiania were the ones who participated most in the turnover phenomenon, either to leave the Brazilian schools or to migrate to other schools in other municipalities or states in Brazil.

In terms of the international literature in the North American context, in terms of results, Ingersoll (2001) showed that the rate of teacher turnover in the private sphere was higher in relation to many conditions (Ingersoll, 2001). The author showed statistically that the overall turnover rate for all schools was 13,2% (7,2% Movers; 6,0% Leavers) (Ingersoll, 2001, p.521); compared to the results of our research work, our rate differs from those presented by Ingersoll, as shown in Table 4 above, the city of Goiania for all schools had the highest turnover rate compared to Ingersoll's study, 28,51% (14,78% Movers; 13,73% Leavers) in Goiania in the state of Goias, Brazil.

According to Ingersoll (2001), the turnover rate was 14,4%(8,7% Movers; 5,7% Leavers) in the American public schools, compared to the American private schools that had a higher general rate of 22,8% (7, 8% Movers; 15,0% Leavers) for the scenario studied (Ingersoll, 2001); in the Brazilian context in Goiania, we also compared the general rate of the administrative department (28,51%) according to the characteristics of teacher turnover between the different departments, the data also revealed that the general rate of turnover of private schools were the highest (27,25%, see table 3) compared to the rates of public schools 23,17% (14,19% Movers; 8,97% Leavers) in the network municipality in administrative dependence. It should be remembered that this general turnover rate in each administrative department was derived from the general turnover rate of the city of Goiania, that is (28,51%, see table 2) for the scenario studied. However, when evaluating the teacher turnover rates, both in the public and private sphere, they were all higher than the rate presented by Ingersoll on teacher turnover in basic education.

In short, of all the possible scenarios in the South Brazilian context, the rate of turnover in either the city or the network municipality of Goiânia is higher than any rate Ingersoll presented in the North American context, whether at the level of all schools, or by type of public and private schools. This means that the rate of teacher turnover found in the city and network municipality of Goiânia exceeded enormously those presented by Ingersoll. In addition, it is the public schools in the network municipality of Goiânia that have faced the most departure of teachers, while in the North American context it is the opposite, that is to say, it is the teachers of private schools that leave the most. This shows that the problem of teacher turnover in public institutions is real and requires the Brazilian state to address it.

3.3 Explanatory Factors of Teachers' Turnover in Basic Education in Goiania: A Look at The Working Conditions

This subsection presented the explanatory factors of this so-called phenomenon of teachers who migrated and left the municipal schools of Goiania based on the characteristics of their working conditions, the characteristics of the public schools that lost these teachers in order to evaluate the level of significance and try to find the predictors that explained the departure or migration of these professionals in the basic education system within the network municipality of Goiania in public schools.

The study involved a logistic regression table of twenty-five variables separated into two groups, i.e., three dependent variables and twenty-two independent variables. The first group contained three dependent variables which were divided as follows: one on general teacher turnover, a second on turnover of teachers who migrated into the profession, and a third on teachers who left the education system.

As for the second group of twenty-two variables, it was divided into three categories: the first category contains four independent variables in which were analyzed the characteristics of the teachers; then, the second category contains fifteen variables based on the analysis of the working conditions of the teachers in the public schools of basic education in the network municipality of Goiania; finally, the last category contains three variables were based on the characteristics of these public schools in the network municipality.

In general, the three statistical logistic regression models were developed to analyze the phenomenon as a whole (see section appendix 1). These models were made by a majority of variables of nominal, ordinal, and binary type for the use of regressions in order to meet the second objective. The data from the Censo Escolar 2016-2017 database for logistic regression were filtered and calculated. The size of the study population was 5,629 teachers in the network municipality of Goiania in public schools was selected and analyzed. The calculation of the probability of the total effect of the independent variables on the response variables in the three models was performed using the formula $P(Y) = 1 / 1 + e^{-(B_0 + \sum \beta X)}$, and showed the level of significance of each predictor. The Hosmer and Lemeshow and Nagelkerke R² goodness-of-fit test on the level of significance was done.

3.3.1 Teachers' Turnover : Logistic Regression Analysis in the Municipal Network of Goiania

In this subsection, the analytical procedures of our research work included the construction of three logistic regression models in which the dependent variables were, respectively, the general turnover of teachers, the turnover of teachers who migrated, and those who left the profession. There are a set of predictors that are based: first, on the characteristics of the teachers which are in particular demographic variables for the qualification of the teachers; second, a set of predictors on the working conditions of the teacher's containing information on the distribution; last, predictors on the characteristics of the schools that were analyzed. The analysis of these predictors was done to know their estimates and the level of significance in the way that in our second objective.

In general, to advance in the analysis of these predictors for public schools in the network municipality of Goiania, table 13, table 14 and table 15 below reproduces the results of the coefficients of the estimates of the three models (M1=General Turnover; M2=Teacher Leavers; M3=Teacher Movers), accompanied with odd ratio, confidence interval, the degree of statistical significance, and then, the Nagelkerke R² test and the Hosmer and Lemeshow R² coefficient on the degree of precision was made. Other analyses were made on the results of the predictors.

A filter was applied on the database of Censo Escolar 2016-2017 to run the regression models, in relation to this, 5,629 data were analyzed on the general turnover about of teachers who migrated and left the profession in the network municipality of Goiania within the public schools to analyze their degree of significance.

Model 1 (table 13) was observed which is based on the variable depending on the general turnover of teachers, there were five predictors that were significant. Of these five predictors, firstly, one was related to the characteristics of teachers namely the age range of these teachers, and Model 1 proved that young teachers aged between 26 to 35 years old (with $b = 0,18$; $p \leq 0,05$) and those with more than 56 years old, age (with $b = 0,24$; $p \leq 0,05$) that were in the turnover; secondly, in terms of the predictors that are related to the working conditions of the teachers, there are four, in relation to this, we found that the type of permanent contract of the teachers (with $b = -1,87$; $p \leq 0,001$), in the level of school networks that they were assigned in teaching (with $b = -0,57$; $p \leq 0,001$) and in the number of schools that they were assigned (with $b = 0,62$; $p \leq 0,001$) are predictors related to the general turnover of these teachers in basic public education in Goiania; lastly, regarding the predictors that are based on the characteristics of the schools during the turnover phenomenon, we had only one predictor that was highly significant which is the type of CMEI unit that these teachers had worked (with $b = 0,55$; $p \leq 0,001$).

Still in model 1, we could see that the predictors associated with teachers who have a type of permanent contract were highly significant along with those who worked in a large number of schools, as well as those who were assigned in a large network. There are many predictors, for example, the contract teachers left the schools spontaneously with the general level of turnover very high, in addition to that, they are teachers with permanent contracts. The probability of the general departure of teachers at the level of this predictor is 72,2%. Thus, in relation to this finding, we can say that model 1 presented a high and very satisfactory number of fit indicators with highly significant predictors.

TABLE 13 – Results of the estimation of Model 1, Odd ratio and Confidence Interval of the Logistic Regression of the General Teachers' Turnover in Public Schools in the Municipal Network of Goiania,2017

	Model 1			Odds Ratio	Conf Interval	
N	5,629					
Dependent Variables ->	<i>General Turnover</i>					
Predictors	<i>b</i>	<i>SE</i>	<i>Sig</i>		2,5%	97,5%
Intercept	0,25	1,51			0,05	22,78
Teacher's Characteristics						
<u>Sex_Gender</u>						
-Male	0,08	0,11		1,08	0,87	1,34
<u>Race_Color</u>						
-Not declared	-1,40	0,88		0,24	0,04	1,82
-White	-1,18	0,88		0,30	0,05	2,26
-Black and Brown	-1,22	0,88		0,29	0,05	2,17
<u>Age_Group</u>						
<= 25	1,11	0,67		3,05	0,83	12,72
26 - 35	0,18	0,09	*	1,20	1,00	1,45
36 - 45	0,10	0,08		1,10	0,93	1,31
56+	0,24	0,12	*	1,27	1,00	1,62
<u>Formation_Level</u>						
-Elementary or Middle School	0,60	0,33	.	1,83	0,94	3,58
-Middle with Teaching	-0,29	0,31		0,74	0,40	1,39
-Higher without degree	0,06	0,24		1,06	0,66	1,74
-Higher Education with degree	0,02	0,21		1,02	0,67	1,58
-Specialization	-0,05	0,21		0,94	0,62	1,46
Teachers' Working Conditions						
<u>Contract_Type</u>						
- Permanent Contract	-1,87	0,09	***	0,15	0,12	0,18
Networks_Number	-0,57	0,15	***	0,56	0,41	0,75
Schools_Number	0,62	0,07	***	1,86	1,61	2,14
Courses_Number	0,01	0,04		1,01	0,93	1,10
<u>Students_Number_Per_Class</u>						
<= 15	-0,00	0,21		0,99	0,65	1,51
15 - 20	0,03	0,18		1,03	0,72	1,47
20 - 25	0,17	0,15		1,19	0,88	1,61
25 - 30	-0,00	0,13		0,99	0,76	1,29
Enrollment_Num_Per_Teacher	-0,00	0,00		0,99	0,99	1,00
Night_Class	-0,13	0,18		0,87	0,60	1,26
Creche_Education	0,06	0,14		1,06	0,81	1,41
PreSchool_Education	0,02	0,10		1,02	0,83	1,26
First_Years_Fund_Education	0,06	0,09		1,07	0,89	1,28
Final_Years_Fund_Education	-0,16	0,10		0,85	0,69	1,05

Middle_Education	0,18	0,24		1,20	0,74	1,96
EJA_Education	0,31	0,18	.	1,37	0,95	1,99
Professional_Education	0,65	0,83		1,93	0,44	13,67
Special_Education	-0,25	0,31		0,77	0,42	1,47
Schools Characteristics						
School_Location	0,08	0,61		1,08	0,35	4,13
Schools_Size	0,00	0,00		1,00	0,99	1,00
Unit_Type						
-CMEI	0,55	0,15	***	1,73	1,27	2,35
<i>Test de Nagelkerke R²</i>	13,5%					
<i>Pourcentage of Prediction</i>	72,7%					
<i>Test Hosmer and Lemershow R²</i>	Chi2(p > 0,05)					

Note. *** $p \leq 0,001$; ** $p \leq 0,01$; * $p \leq 0,05$; . $p \leq 0,1$; $p \leq 1$;

Legend: b=Estimation; S.E=Standard Error; Sig=Level of Significance

With codes *** $p \leq 0,001$: Highly significant; ** $p \leq 0,01$: Very significant; * $p \leq 0,05$: Significant;

. $p \leq 0,1$: Almost Significant; $p \leq 1$: Not significant

Source: Elaborated by the Author from Dados de Censo Escolar / INEP (2016 e 2017)

In the Odd Ratio analysis, we found that almost all of the odd ratios of the predictors in Model 1 are greater than or equal to 1. For example, we have the odd ratio of the middle-education teachers who participated in the rotation phenomenon that possessed a larger factor (1,838) than the odd ratio of the high education teachers with degrees (1,023) in the general rotation phenomenon. In other words, for every middle-education faculty member who was in the general rotation phenomenon, the odd ratio increased by a factor of 1,838; and those with high education and a degree also increased by a factor of 1,023. The Odd ratio of the professors who have a medium level of training who participated in the phenomenon of general rotation is 83,80% greater than the odd ratio of the professors with a high level of training with a degree who were in the phenomenon (2,37%). This showed that as the numbers of predictors increase, the probability for the phenomenon of general rotation to occur through for teachers in public schools is enormous, unlike if the values were less than 1, the phenomenon would have been is less likely to occur.

The 95% confidence interval is an interval of values that has a 95% chance of containing the true value of the estimated parameter, i.e. the set of values reasonably compatible with the observed result [2,5%; 97,5%]. In terms of the confidence interval for model 1, we have seen that the intercept has been carried to the interval between [0,05; 22,78]. In this way we can be fairly confident that as the values of each predictor fall within the range, this means that as the predictors increase there is a probability that the rate of teacher turnover will also increase. The lower and upper bounds of the confidence interval are positive, and the margin of measurement error is small, which shows that there is a statistically significant effect, as the results of the observed turnover phenomenon are interesting.

In Model 2 (table 14) which is based on the turnover of teachers who left the profession (Leavers), we could see that there are four predictors that were significant, then we saw that two other predictors were almost significant. Regarding the predictors that were significant, we observed that one is found at the level of the characteristics of teachers that it is only teachers older than 56 years (with $b = 4,15$; $p \leq 0,01$); secondly, at the level of the predictors that are related to the working conditions of teachers, we have three, in relation to that, we found again that teachers with a permanent type of contract (with $b = -1,67$; $p \leq 0,001$), in the number of schools they were assigned (with $b = -9,61$; $p \leq 0,001$), and the number of enrollment per teacher in these schools (with $b = -7,08$; $p \leq 0,01$) were the predictors related to the departure of these teachers in the basic public schools in Goiania; lastly, model 2 did not show predictors based on the characteristics of the schools during the phenomenon of turnover with definitive departure decision to abandon the profession in favor of another activity.

Analyzing model 2, the age predictor which is based on teachers aged 56 and over was significant, and showed that teachers of this level left the profession in basic public schools, either to retire or otherwise. We found that whenever a teacher is recruited to work in a school, it is the teachers with permanent contracts who tend to leave the schools depending on their working conditions, along with the volume of schools they have been assigned to teach, and the number of teachers enrolled in these schools to work. The probability of teachers who left the profession is 48,1%. So, although all the variables representative of the model on the turnover of teachers leaving in model 2 were not all significant, except for the predictor type of contract accompanied by two other predictors that were highly significant, we can say that model 2 presented a sufficient fit indicator to predict the turnover of teachers that leave public schools in the municipal network of Goiania.

TABLE 14 – Results of Model 2 estimation, odd ratio and Confidence Interval of the Logistic Regression of the Turnover of Teachers who left the Public Schools in the Municipal Network of Goiania, 2017

	Model 2			Odds Ratio	Conf Interval	
N	5,629					
Dependent Variables ->	<i>Teachers Leavers</i>					
Predictors	<i>b</i>	<i>SE</i>	<i>Sig</i>		2,5%	97,5%
Intercept	-2,58	6,76			1,19	3,89
Teacher's Characteristics						
<u>Sex_Gender</u>						
-Male	3,15	1,73	.	1,37	9,68	1,91
<u>Race_Color</u>						
-Not declared	1,27	5,68		3,43	8,00	
-White	1,28	5,68		3,68	8,45	
-Black and Brown	1,28	5,68		3,67	8,43	
<u>Age_Group</u>						
<= 25	1,25	7,04	.	3,51	8,49	1,40
26 - 35	-1,89	1,44		8,27	6,22	1,09
36 - 45	-9,53	1,25		9,09	7,11	1,16
56+	4,15	1,58	**	1,51	1,10	2,06
<u>Formation_Level</u>						
-Elementary or Middle School	7,29	4,42	.	2,07	8,80	5,04
-Middle with Teaching	-2,28	4,47		7,95	3,30	1,93
-Higher without degree	1,33	3,66		1,14	3,73	2,43
-Higher Education with degree	-4,67	3,32		9,54	5,15	1,91
-Specialization	-7,30	3,34		9,29	5,00	1,87
Teachers' Working Conditions						
<u>Contract_Type</u>						
- Permanent Contract	-1,67	1,20	***	1,86	1,47	2,36
Networks_Number	2,54	3,13		1,28	6,75	2,33
Schools_Number	-9,61	1,65	***	3,82	2,73	5,24
Courses_Number	1,11	9,31		1,11	9,28	1,33
<u>Students_Number_Per_Class</u>						
<= 15	-2,26	3,14		7,97	4,30	1,47
15 - 20	-1,21	2,63		8,85	5,30	1,49
20 - 25	-2,51	2,21		8,59	5,59	1,33
25 - 30	-2,37	1,96		7,88	5,39	1,16
Enrollment_Num_Per_Teacher	-7,08	3,52	*	9,92	9,86	9,99
Night_Class	-1,22	4,38		8,84	3,55	2,01
Creche_Education	4,26	2,27	.	1,53	9,82	2,40
PreSchool_Education	3,85	1,69		1,03	7,48	1,45
First_Years_Fund_Education	2,37	1,51		1,26	9,40	1,70
Final_Years_Fund_Education	1,77	1,75		1,19	8,47	1,68

Middle_Education	8,75	7,88		2,40	6,17	1,59
EJA_Education	6,36	4,10		1,88	8,87	4,49
Professional_Education	1,18	3,66		1,44	1,23	2,81
Special_Education	-291	4,40		7,47	3,28	1,86
Schools Characteristics						
School_Location	-2,19	7,08		8,02	2,24	3,88
Schools_Size	2,70	3,04		1,00	9,99	1,00
Unit_Type						
-CMEI	1,94	2,33		1,21	7,69	1,92
<i>Test de Nagelkerke R²</i>	17,2%					
<i>Pourcentage of Prediction</i>	48,1%					
<i>Test Hosmer and Lemershow R²</i>	Chi2(p > 0,05)					

Note. ***p≤0,001; **p≤0,01; *p≤0,05; . p≤0,1; p≤1;

Legend : b = Estimation, S.E. = Standard Error, Sig. = Level of Significance

With codes ***p≤0,001: Highly significant; **p≤0,01: Very significant; *p≤0,05: Significant;

. p≤0,1: Almost Significant; p≤1: Not significant

Source: Elaborated by the Author from Dados de Censo Escolar / INEP (2016 e 2017)

Regarding the analysis of the odd ratio of model 2, we found almost all the odd ratio of the predictors are greater than or equal to 1. We have for example, the odd ratio of the teachers of medium training level who left the profession in the phenomenon of rotation, which possessed a smaller factor (2,074) compared to the odd ratio of the teachers of high training level with diploma (9,543) in the course of the phenomenon in the basic educational system within the public schools in the municipal network of Goiania. In another language, for each teacher of medium training level who left the public schools in the phenomenon of rotation, the odd ratio decreased by a factor of 2,074 compared to those with high training level with diploma that increased by a factor of 9,543. This showed that as the predictor scores increased, the likelihood of teachers leaving public schools during the turnover phenomenon was huge, unlike if the values were less than 1, the phenomenon would have been is less likely to occur.

In terms of the confidence interval for model 2, we found that the intercept was carried over the interval between [1,19; 3,89]. In this way we are quite confident, because, as the values of each predictor fall within the interval, this means that as the predictors increase there is a probability that the rate of teacher turnover from public schools will also increase. The lower and upper bounds of the confidence interval are positive, and the margin of measurement error is small, this shows that there is a significant effect, and the results of the observed turnover of teachers who dropped out are interesting.

Within Model 3 (table 15) based on the teachers who migrated, we found that there are seven significant predictors and that there is one other that was almost significant. Of these predictors, we observed: first, in terms of teacher characteristics, younger teachers between the ages of 26 and 35 ($b = 0,41$; $p \leq 0,001$) and those over 56 ($b = 0,25$; $p \leq 0,05$) were the most to migrate in the profession, then, teachers belonging to all colors and race as white ($b = -1,92$; $p \leq 0,05$), black and brown teachers ($b = -1,94$; $p \leq 0,05$) and those who were not declared ($b = -2,18$; $p \leq 0,05$) that model 3 predicted were migrated the most to other schools in the municipal network; secondly, we observed the presence of four predictors at the level of working conditions of teachers, these predictors always showed that it is the teachers with permanent contract (with $b = -1,28$; $p \leq 0,001$), those who have been linked to a school network (with $b = -0,66$; $p \leq 0,001$), those who were assigned to a large number of schools to work (with $b = 1,05$; $p \leq 0,001$) and teachers working in the last years of basic education (with $b = -0,42$; $p \leq 0,001$) were most related to migration to basic public schools in Goiania with a high rate of significance in all these predictors; Lastly, we found within the characteristics of the schools that only one predictor was highly significant namely the type of teaching unit based on CMEI that the teachers worked ($b = 0,67$; $p \leq 0,001$), which means that many teachers left the CMEI in the municipal network of Goiania to migrate to other schools that may be in the same district or in different districts.

It should be said that in Model 3, which is based on migration, it is young teachers accompanied by those who are old, then, those who were part of all races of white and indigenous colors, then, those who were assigned in a large number of schools and school network to work, added to those who have the most permanent contract had the greatest tendency to migrate to other schools in the profession. In the phenomenon of migration, the public schools where they were migrated can be within the same network municipality (intra-district migration) in which they worked, or in different municipalities (extra-district migration). Thus, the majority of the predictors in this model presented were highly significant and also explained the phenomenon of teacher turnover through migration. The probability of the existence of this migration is 29,2%. Finally, model 3 presented very good fit indicators.

TABLE 15 – Results of the estimation of Model 3, Odd ratio and Confidence Interval of the Logistic Regression of the Rotation of Teachers who migrated from Public Schools in the Municipal Network of Goiania, 2017

	Model 3			Odds Ratio	Conf Interval	
N	5,629					
Dependent Variables ->	<i>Teachers Movers</i>					
Predictors	<i>b</i>	<i>SE</i>	<i>Sig</i>		2,5%	97,5%
Intercept	-1,10	1,78			0,00	8,80
Teacher's Characteristics						
<u>Sex_Gender</u>						
-Male	-0,05	0,12		0,94	0,72	1,21
<u>Race_Color</u>						
-Not declared	-2,18	0,88	*	0,11	0,02	0,83
-White	-1,92	0,88	*	0,14	0,02	1,07
-Black and Brown	-1,94	0,88	*	0,14	0,02	1,05
<u>Age_Group</u>						
<= 25	0,11	0,82		0,12	0,16	4,85
26 - 35	0,41	0,11	***	1,51	1,21	1,88
36 - 45	0,25	0,10	*	1,28	1,05	1,58
56+	-0,02	0,16		0,97	0,69	1,33
<u>Formation_Level</u>						
-Elementary or Middle School	0,05	0,41		1,06	0,45	2,37
-Middle with Teaching	-0,30	0,38		0,73	0,33	1,57
-Higher without degree	-0,05	0,29		0,94	0,53	1,71
-Higher Education with degree	0,08	0,25		1,08	0,67	1,82
-Specialization	-0,02	0,25		0,97	0,60	1,65
Teachers' Working Conditions						
<u>Contract_Type</u>						
- Permanent Contract	-1,28	0,11	***	0,27	0,22	0,34
Networks_Number	-0,66	0,16	***	0,51	0,37	0,70
Schools_Number	1,05	0,08	***	2,88	2,46	3,38
Courses_Number	0,04	0,04		1,03	0,94	1,13
<u>Students_Number_Per_Class</u>						
<= 15	-0,02	0,26		0,97	0,58	1,64
15 - 20	0,00	0,22		1,00	0,65	1,56
20 - 25	0,23	0,18		1,26	0,88	1,84
25 - 30	0,10	0,16		1,10	0,81	1,52
Enrollment_Num_Per_Teacher	-0,00	0,00		0,99	0,99	1,00
Night_Class	-0,19	0,20		0,82	0,54	1,23
Creche_Education	-0,22	0,16		0,79	0,57	1,09
PreSchool_Education	0,01	0,12		1,01	0,79	1,28
First_Years_Fund_Education	-0,04	0,10		0,95	0,77	1,17
Final_Years_Fund_Education	-0,42	0,12	***	0,65	0,51	0,83

Middle_Education	0,19	0,26		1,21	0,72	2,06
EJA_Education	0,30	0,20		1,35	0,90	2,06
Professional_Education	0,48	0,82		1,62	0,37	11,22
Special_Education	-0,13	0,40		0,87	0,41	2,03
Schools Characteristics						
School_Location	0,74	1,05		2,09	0,39	38,87
Schools_Size	0,00	0,00		1,00	0,99	1,00
Unit_Type						
-CMEI	0,67	0,18	***	1,95	1,36	2,82
<i>Test de Nagelkerke R²</i>	13,1%					
<i>Pourcentage of Prediction</i>	29,2%					
<i>Test Hosmer and Lemershow R²</i>	Chi2(p > 0,05)					

Note. *** $p \leq 0,001$; ** $p \leq 0,01$; * $p \leq 0,05$; . $p \leq 0,1$; $p \leq 1$;

Legend : b = Estimation, S.E. = Standard Error, Sig. = Level of Significance

With codes *** $p \leq 0,001$: Highly significant; ** $p \leq 0,01$: Very significant; * $p \leq 0,05$: Significant;

. $p \leq 0,1$: Almost Significant; $p \leq 1$: Not significant

Source: Elaborated by the Author from Dados de Censo Escolar / INEP (2016 e 2017)

The analysis of the odd Ratio of the model 3 allowed us to observe that almost all the odd ratio of the predictors are superior or equal to 1. As an example, the odd ratio of the teachers of average formation level that migrated in other school in the profession in the phenomenon of the rotation, possessed a smaller factor (1,060) compared to the odd ratio of the teachers of high formation level with diploma (1,085) during the phenomenon in the basic education system within the public schools in the municipal network of Goiania. In other words, for each teacher with medium level of training who migrated in public schools to work in other schools in the phenomenon of rotation, the odd ratio decreased by a factor of 1,060 compared to those with high level of training with diploma that increased by a factor of 1,085. This showed that as the predictor scores increased, the likelihood of teachers migrating to public schools during the rotation phenomenon was huge, unlike if the values were less than 1, the phenomenon would have been is less likely to occur.

In terms of the confidence interval for model 3, we found that the intercept was carried over the interval between [0,00; 8,80]. In this way we are quite confident, because, as the values of each predictor fall within the range, this means that as the predictors increase there is a likelihood that the rate of turnover of teachers who have migrated from public schools will also increase. The lower and upper bounds of the confidence interval are positive, and the margin of measurement error is small, indicating that there is a significant effect, and the results of the phenomenon of observed turnover of teachers who have moved to other schools are interesting.

In fact, by analyzing the three models (M1=General Turnover; M2=Teacher Leavers; M3=Teacher Movers) at the level of logistic regression, we found, on the one hand, that there are variables that were not good predictors in the phenomenon of teacher turnover, because they did not have a pvalue lower than 0,05. Then, there are other variables that were almost significant in the phenomenon of general teacher turnover; on the other hand, there were also several other variables that were very significant and were good predictors. These predictors showed us some factors that predicted the turnover of teachers in the public schools of the municipal network of Goiania.

The turnover was done through young and old teachers; teachers belonged to all the colors and races with the number of enrollments by teachers in the schools to work; those with permanent contracts; those who worked in the types of CMEI unit; and teachers who taught in the fundamental education of the final years left or migrated in other schools that can be public or private according to the different working conditions and common characteristic of each of them in the schools. Comparing the three models of the regression, we could see that the difference between them in the analysis of residual deviance are not the same (M1=5562,5 ; M2=2939,5 ; M3=4171,5), which also showed that model 2 is more improved compared to the other two models with its four significant predictors, and due to its lowest residual deviance. In addition, we could see that in the AIC analysis of the three models (M1=5632,5 ; M2=3007,5 ; M3=4241,5), model 2 also presented the lowest AIC than the other two models, which shows that model 2 is the best compared to the others with its significant predictors.

At the level of the analysis of the null deviance, it is the lower values that will indicate that the models predict the outcome variables more accurately. In fact, we obtained the null deviance for the three eastern models (M1= 6090,2; M2= 3393,5 and M3= 4598,0), and the null deviance of model 2 is the lowest compared to the other two. This reduction tells us that model 2 is better than the other two in predicting the level of turnover of teachers who have left the educational system in the network municipality of Goiania. Then, comparing the 3 models we checked the difference in the statistics of the null deviance -2LL that was distributed

according to the method of chi-square (R^2), we could see that model 1 had different values displayed (R^2 . hl = 0,43; R .cs= R .n=0,99); then, in model 2, we found that the control (R^2 .hl= 0.77; R .cs = R .n = 0,98); then, model 3 with (R^2 .hl= 0,57; R .cs = R .n = 0,97).

Within the multi-linearity test, the results indicate that there were no collinearity problems, as the majority of the predictors related to VIF are below 10 in all three models. We have only identified at the level of the three models that only two predictors exceed the value of 10, evening the of recruitment per professor and the number of courses of the professors. On the other hand, we also noticed in the results of the three models that the VIF of the predictors of professional education ($Vif=1,04$; $Vif=1,00$) in model 1 and 2, and the location of public schools in model 3 ($Vif=1,02$) among many other independent variables have the lowest level of VIF in the regression models. As for the means of the VIF in the three models, they were distributed at $M1=2,88$; $M2=2,69$ and $M3=2,93$. Although there are two predictors that exceeded the level of 10 in the results concerning the VIF, but, the majority of the variables in the three models have a very low level of VIF that do not exceed 4,64, that is, they are lower than 10. This is very good for the models in the test of multi-collinearity, including all the variables that are significant depending on each model where their degrees of significance have been found.

At the level of the Nagelkelke test statistic, the high R^2 do not necessarily distrust anything, because, R^2 is an index of fitness and can be compared to each other in the three models. We perceived in the Nagelkelke R^2 test that through the three models ($M1=M3=0,13$; $M2=0,17$) that the highest score is found in model 2 which is associated to the teachers who left the teaching profession during the turnover phenomenon in the public basic schools in the network municipality of Goiania (Leavers), in this sense, the higher the score, the higher the fitness of the predictive model. Then, the model 1 and 3 (Movers) have the same score in the test.

The Hosmer-Lemeshow Test is based on judging the degree of accuracy of the R^2 logistic model and also the goodness of fit in a logistic regression, more specifically for risk prediction models. The logic of the Hosmer-Lemeshow statistic indicates a poor fit if the significance value is less than 0,05 ($p \leq 0,05$). Through this goodness-of-fit test in our models, we were able to see that there are significant differences ($M1= 0,08$; $M2=0,13$; $M3=0,09$) between the classifications made by the models' predictors and the observed reality. The three models have a pvalue result higher than 0,05 ($p > 0,05$), while adding that model 2 compared to the others had the highest and farthest possible pvalue score (0,13), therefore, the result of the

models fits more adequately to the data with quality, and this indicates to what extent the data fits especially with the pvalue results that are higher than 0,05.

In fact, in this section we have identified a number of predictors that have been shown to have a bearing on teachers' decision to migrate or leave basic education altogether. All of these have been identified in the characteristics of teachers and schools, in the working conditions, as well as in the characteristics of the schools in table 13, table 14 and table 15. Then, the analysis of all these predictors according to the response variables proved us the causes of the turnover of teachers in the network municipality of Goiania is real, because, there are several predictors that were highly significant in the three models.

In terms of teacher characteristics, when compared to the North American context, Carver-Thomas and Darling Harmong (2019) showed us statistically that age is a factor that is related to teacher attrition rates, added to teachers (25,0%) who entered the profession through a temporary contract program, then ,full-time teachers who were provided with a temporary contract (Carver-Thomas et al., 2019).

In the same context in the United States, Ingersoll (2001) analyzed these same predictors and also found statistical evidence that teacher age is one of the most important predictors of the likelihood of turnover, and that younger (≤ 30 years) and older (≥ 50 years) teachers were more likely to leave than middle-aged teachers (Ingersoll, 2001), with the addition of specialized teachers who were more likely to leave. Some of the predictors analyzed by Ingersoll were almost significant in his model, but in other models he analyzed, there were predictors with a simple level of significance.

Compared to the case of our study for the municipal network of Goiania in public schools, on the analysis of the predictors of the three models in the last three tables, we also showed in a similar way that Ingersoll, Thomas and Harmong that the age was one of the statistically significant predictors in the 3 models of the regression, in addition, it was the youngest teachers, that is, aged between 26 to 35, between 36 to 45 years that migrated the most and left the profession; on the other hand, the teachers by color and race ($p \leq 0,05$) were also significant predictors in the third model (Movers), without forgetting the various other predictors found in the models with high levels of significance.

In the Carver-Thomas and Darling Harmond study of teacher working conditions in the United States, we found that some predictors in their models were not significant with turnover, however, the predictor based on lack of administrative support was the most predictive of turnover of teachers who dropped out of school, and this predictor had a level of significance (Carver-Thomas et al., 2019). In this same reality, Ingersoll (2001) showed that three of the four predictors based on working conditions were significantly associated with teacher turnover, for example, the lack of support reported in schools by teachers was associated with a 23,0% difference in the likelihood of a teacher leaving, in addition, schools with high student discipline problems had a significantly higher turnover rate (Ingersoll, 2001).

In terms of analysis and comparison of these predictors based on the working conditions in our study, and based on the results of table 13, table 14, and table 15 in which are the three models for the municipal network of Goiania for public schools in basic education, we were able to show that the predictor of teachers with teaching work contracts in the school system was highly significant with a negative signal in all three models ($p \leq 0,001$), which shows the probability for teachers to migrate and leave the profession and schools is very strong. In addition, the predictors of teachers with permanent contracts added to other characteristics based on the working conditions, the number of network number that they were associated, the number of schools that they committed to work, as well as the teachers who worked in the fundamental teaching of the final years in the schools were the most important that predicted this phenomenon studying the teachers' turnover according to these predictors.

In terms of the characteristic of schools in the U.S. literature, Carver-Thomas and Darling Hammond (2019) presented us with a report on the number of students in the halls of schools associated with their poverty levels, in relation to this, 25,0% of teachers were more likely to migrate or leave teaching because of this (Carver-Thomas et al., 2019); on the other hand, Ingersoll (2001) has also showed that school space appears to be a significant variable in small schools where teacher attrition is more frequent at each enrollment level of 100 students is associated with a 4,0% difference in the probability of teacher attrition (Ingersoll, 2001), meaning, too many students put into such small classrooms in terms of work space.

In our study, on our predictors for the municipal network of Goiania in the South American context, on the characteristics of the schools, on the contrary, we found that it was the types of CMEI unit only identified in model 1 and model 3 (table 13 and table 15) that were highly significant in the phenomenon of turnover, which shows a high probability of migration of teachers who worked in CMEI schools during the phenomenon of turnover exists.

Indeed, there are other predictors that were almost significant in the models ($p \leq 0,1$), for example, male teachers, aged less than 25 years, who have a medium level of education, working in the level of education of youth and adult education (EJA), then, in the education of the Nursery ($p \leq 0,1$) according to the results of the three models in the last three tables of the study, all these predictors, whether highly, simply or almost significant played their role in the phenomenon of turnover, on the other hand, only the variable presented as non-significant that are not supported in this work.

Thus, we found in our three models variables that become significant predictors, which were presented and statistically proven through the phenomenon of teacher turnover in the municipal network of Goiania in public schools, and which were mostly similar to those presented by Ingersoll and Carver-Thomas and Darling Harmong. Indeed, these predictors showed the probability of Brazilian teachers who migrated and left the profession is related with the working conditions of teachers and characteristics of public schools in the municipal network of Goiania. Then, there are some predictors that were almost significant, and also those that were met not significant in the turnover of teachers in our study, just as is the case of some literature of the authors that we reviewed, but, the important thing was to identify the predictors that helped to explain the most the phenomenon. Then, there are some predictors that were almost significant and also those that were met not significant in teachers' turnover in our study, just as is the case of some literature of the authors that we reviewed, with the case of the results of Ingersoll's models, not all variables were significant.

To conclude, with the presence of this phenomenon, it is necessary an innovative educational public policy accompanied by a public action by the educational managers of the State of Goias in order to solve the phenomenon of turnover in public schools in the municipal network of Goiania where the study was carried out.

4 Final Considerations

This research work started with the main objective of examining the phenomenon of teacher turnover in public schools of basic education in the network municipality of Goiania. From this general objective, two specific objectives were forged, the first specific objective was to know the rate of teacher turnover in public schools, while the second objective was devoted to the identification of the explanatory factors of teacher turnover with respect to their characteristics in schools and working conditions in public schools in the context in which the turnover was produced.

The study was based on the knowledge of the phenomenon of teacher turnover in basic education at the national level and is based on a quantitative methodology accompanied by the indications of other scientific studies that have already been carried out in the international arena. The study was done empirically and the technique of logistic regression was used, then, it was spatially delimited in the network municipal of Goiania in 2017 on teachers in public schools while measuring the magnitude of the phenomenon. The results found in the work were then compared with those expressed in the empirical knowledge of national and international literature of the North American context.

First, to initiate the study, the guiding question in relation to the first specific objective was recalled: What is the rate of teachers' turnover? Then, the construction of an indicator was presented in the concept of teacher turnover to research and identify desirable properties. The issue of intra and inter district migration was addressed, as well as retirement and voluntary departure of teachers. The fundamental question was tested and showed an adequate response for all scenarios forged for the analysis. The study showed that many teachers in basic education were migrated to other schools and districts, while others left the public schools in the network municipality of Goiania in the state of Goiás.

The results obtained allowed us to statistically and scientifically affirm that the general rate of teacher turnover in the city of Goiania during the period of 2016-2017 was 28,51% (14,78% Migrations; 13,73% Leavers); then, analyzing this rate, we were able to break it down statistically by administrative department to find those of the network municipality with 28,51% (32,88% Federal; 40,27% State; 23,17% Municipal; 27,25% Private) ; finally, we found the rate of teachers who migrated (14,19%), as well as those who left (8,97%) the public schools in basic education from the rate of the network municipality (23,17%) found in the administrative department of Goiania. Thus, this rate during the said period corresponds positively to our expectation in the first objective.

The results also allowed us to see by administrative dependency that from the statistics obtained for all the schools in the city, that the rate in the Municipal Public network (23,17%) is a little low compared to the rates of other administrative departments. In ascending order, with the municipal network (23,17%), the private network (27,25%); the Federal network (32,88%). The greatest dispersion of teacher turnover rates was found in the State public network (40,27%). In spite of this, the results are similar, because the administrative departments all have a significant number of turnovers that have been found.

Secondly, in the second part of this work, comes the question that is related to the second specific objective: What are the explanatory factors of the teacher's turnover in the profession? In this part based on the analysis of the logistic regression of the three models, we identified the different predictors that were weakly and highly significant in front of this phenomenon of teacher turnover according to the characteristics of the teachers and the schools, and also based on the working conditions in the Brazilian public schools in the network municipality of Goiania.

The results of the logistic regression showed through predictors that in total, seven variables were significant. Within the characteristics of the teachers, on the one hand, there are the young teachers and ages, that is, those who are aged between 26 to 35 ($p \leq 0,001$) and those who are 56 years and older ($p \leq 0,01$) migrated the most and left the profession in the three models; on the other hand, there is a level of significance in the predictors based on all the teachers belonging to the white race ($p \leq 0,05$) who migrated.

This is the same reality on the significant predictors based on the teachers' working conditions in the three regression models in table 13, table 14 and table 15. During this phenomenon, we found that the teachers who migrated and left the profession had permanent contracts ($p \leq 0,001$); and these contracts were had in a large number of schools or the registration number of these teachers found ($p \leq 0,01$); they assigned themselves to a large number of networks to work ($p \leq 0,001$), accompanied by those who worked in basic education in the final years ($p \leq 0,001$); and the number of enrollments per teacher in the schools ($p \leq 0,05$). In addition, according to the results on the characteristics of these schools, it was the public schools CMEI ($p \leq 0,001$) that were most affected by the migration of these teachers. As for the others, there are some that were almost significant, and others not significant. So, all these predictors are explanatory factors that showed statistically that teachers move and left the public schools in the municipal network of Goiania.

Thus, the study shows that through the present phenomenon that the results certain predictors are significant by analyzing the three regression models on teachers who migrated and left the school in the network municipality of Goiania. Some of the predictors are similar to those that Ingersoll, Carver-Thomas and Darling Hammond found in his analysis of predictor variables. The comparison of the results with these studies confirms that turnover exists and is ravaging the school due to teacher departures as mentioned in our literature review.

During our research we encountered difficulties in analyzing large volumes of data from secondary sources that are related to this research, and also there were other difficulties on how to slice the database in order to select all the variables targeted for the application of the logistic regression analysis technique for the three models that were planned in the methodological phase. In addition, there is a change in the way teachers are identified by the new type of unique id number in the Censo Escolar databases from 2018 onwards, and this has led to a new formality for extracting the data using the teachers' identifiers from previous years together.

Any scientific work has delimitations, in this sense, this work has only presented the teachers turnover who have migrated and left the schools, accompanied by the factors associated with it, but has not dealt with data : a) on the new type of activity that teachers have started after leaving the profession ; b) the work did not identify the name of the new schools that the teachers migrated to when they went to different districts or when they stayed in the same district; c) did not show exactly in which district the teachers migrated to go to work in another in public schools; d) did not identify the type of departure of teachers which can be temporary or permanent. Then, this delimitation is an important issue for future research.

It should be noted that the efforts expressed in this research were aimed at theoretically helping and discussing the explanatory factors related to this phenomenon at the national level. This has generated a very wide panorama of analysis and infinite possibilities of discussion, which has necessitated the taking of decisions. In relation to these different limitations presented in the work, there are possibilities for open research avenues to further explore new findings on the issue of teacher turnover in schools. It is indicated that further studies can be conducted in an applied manner by researchers through strategies and means that prove effective in identifying and clarifying each of these limitations constituting avenues of research. In relation to these avenues that raise the need for in-depth studies, we can mention:

The first avenue concerns the identification of the new types of work that the teachers engage in when they leave the schools for better living conditions; the second refers to the identification of the names of the schools and all the districts that each teacher has migrated to when they leave a school in order to get better treatment on the working conditions; and the third avenue refers to know the new salary that these teachers earn to see if their living costs are improved as well as their conditions and work;

Within society, schools are at the center of the life of each one of us, therefore, it is imperative that each individual has access to a formal and quality education, which is done first by children, then by young people, as well as by adults, because the school represents much more than a place of work, it is not a simple additional service, but it is a vector of social transformation, a mine of which the children are the treasures (Buarque, 2007) In education, schools are vital spaces to shape the mental horizon of the new generations, transmitting a large amount of knowledge with the expertise of teachers, with the aim of developing citizens to create healthy and stable societies, promoting solidarity and fighting against hatred and rivalries. In this sense, Stromquist (2018) told us that teachers therefore bear a huge responsibility in the daily exercise of their profession to train citizens (Stromquist, 2018).

Teachers are artists of knowledge, as conductors of knowledge, they give us knowledge, and must receive a fair remuneration to have dedication in the vocation of teaching. To make this possible, take care of them in the educational system is necessary, in this regard, we make the following recommendations to state officials and educational managers:

Firstly, to create an educational model accompanied by an educational public policy in the system adapted to the needs of teachers, while applying with standard of effective educational public policy open to all in education in order to achieve excellent results;

Secondly, to give a competitive salary to teachers and good employment contract, while rewarding at the end of each year those who have been excellent in their work in order to encourage them, because a good salary is an encouraging factor for the teacher, it will prevent them from going elsewhere in search of good working conditions and salary. To do this, there must be an increase in funding in the basic education budget, which is the work of the federal government through the educational managers to invest and take care of teachers. This funding will help school administrators to better invest in teachers, students and school equipment and administrative staff in schools;

Thirdly, reducing the size of students in classrooms is advisable to achieve a process of reducing the workload of teachers, on the one hand, it will allow them to work less and while optimizing their performance in the classroom, and on the other hand, it will allow students to obtain better academic performance. The fact of having an overcrowded room of students, accompanied by a degradation of work space in terms of school infrastructure and poor modern educational equipment is a huge weight that weighs on the back of teachers and can lead them to a process of professional and academic demotivation;

Ultimately, to implement a program of continuous training in various disciplines for the teachers in order to help them to remain effective and up to date in their profession, this will appear as a sign of respect to them and of valorization of the knowledge, because, as an artist of the knowledge that transmits its knowledge to the different generations, it is of the duty of the State to maintain them up to date so that the formations that they are giving to the citizens can be adapted in the present context while moving away from the educational archaisms.

Indeed, this research work brings a scientific contribution in the Brazilian educational system, because, previously, there was no work done that simultaneously dealt with the phenomenon of teachers that both migrate (Movers) and leave (Leavers) the schools in Goiania, in this sense, this contribution will allow the different researchers to be enriched by these originalities when they will have to work on their projects according to the modalities of the scientific research.

This scientific contribution will be useful to these researchers who will take into account our lines of thought and recommendations left to work more deeply on this phenomenon that other studies have not yet covered, using strategies and tools that prove to be effective, this would allow them to have clearer answers so that there is a profound change in the functioning of the educational system, so that the socio-educational situations of teachers change in Brazil, mainly in the network municipality of Goiania.

The existence of quality education depends on the delivery of positive results of students in schools, and these results depend on the presence of teachers in the classrooms, accompanied by their academic performance to make the educational system work well in order to achieve positive overall results in the educational system in an entire country, in order to reduce the de-education of citizens. Berg and Felicia (2015) showed us eight (8) fundamental criteria to be taken into account for a good recruitment and management of teachers in the educational system in order to stabilize them (Berg & Felicia, 2015), and, these criteria go in the direction of effective decision-making in order to decrease or even avoid the teachers' turnover in schools. In this sense, we have presented some reflection clues above.

We think that the State through its educational managers must also use these recommendations to work on this phenomenon of teachers turnover in order to innovate, because, science is the most efficient way to solve social problems; And for this, there should be a dialogue between the different sectors of the Brazilian national life, in this case the educational and social sector to solve this problem, because, the socio-educational future of Brazil, more specifically, the network municipality of Goiania depends on the decisions that the educational managers decide today in the Political-Educational sphere.

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Appendix 1 – Statistics Models 2016-2017 (RStudio Software Running)

```
Model1 <- glm(Turnover ~., data = BaseFinalGT, family = binomial(logit))
Model2 <- glm(Leavers ~., data = BaseFinalLeav, family = binomial(logit))
Model3 <- glm(Movers ~., data = BaseFinalMov, family = binomial(logit))
```

Model 1

```
> summary(Model1)
```

```
Call:
glm(formula = Turnover ~ ., family = binomial(logit), data = BaseFinalGT)
```

```
Deviance Residuals:
```

```
      Min       1Q   Median       3Q      Max
-1.8487  -0.6968  -0.5790  -0.4464   2.2729
```

```
Coefficients:
```

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	0.2538354	1.5176613	0.167	0.867170
TP_SEX01	0.0841640	0.1106217	0.761	0.446760
cor_raca0	-1.4021244	0.8868838	-1.581	0.113888
cor_raca1	-1.1846997	0.8847320	-1.339	0.180555
cor_raca2	-1.2212406	0.8847544	-1.380	0.167489
faixa_etaria1	1.1154907	0.6793258	1.642	0.100578
faixa_etaria2	0.1875998	0.0946541	1.982	0.047485 *
faixa_etaria3	0.1028063	0.0855483	1.202	0.229467
faixa_etaria5	0.2457668	0.1224829	2.007	0.044799 **
formacao1	0.6086847	0.3399216	1.791	0.073348 .
formacao2	-0.2879798	0.3165508	-0.910	0.362958
formacao3	0.0626276	0.2470703	0.253	0.799897
formacao4	0.0234929	0.2167838	0.108	0.913702
formacao5	-0.0569468	0.2181728	-0.261	0.794079
TIPO_CONTRATO1	-1.8717222	0.0997371	-18.767	< 2e-16 ***
N_redes	-0.5766524	0.1504763	-3.832	0.000127 ***
N_escolas	0.6219666	0.0722189	8.612	< 2e-16 ***
N_turmas	0.0145393	0.0440851	0.330	0.741550
Aluno_por_turma1	-0.0019567	0.2137960	-0.009	0.992698
Aluno_por_turma2	0.0311439	0.1805419	0.173	0.863043
Aluno_por_turma3	0.1771492	0.1529421	1.158	0.246751
Aluno_por_turma4	-0.0045975	0.1334501	-0.034	0.972517
N_matriculas_por_docente	-0.0016181	0.0015324	-1.056	0.290985
Turma_noturna0	-0.1355259	0.1888535	-0.718	0.472989
creche0	0.0664361	0.1416179	0.469	0.638982
pre_escola0	0.0285481	0.1058112	0.270	0.787312
EF10	0.0699179	0.0921974	0.758	0.448242
EF20	-0.1604961	0.1071027	-1.499	0.133997
EM0	0.1863151	0.2468230	0.755	0.450337
EJA0	0.3158940	0.1879537	1.681	0.092821 .
EPO	0.6599695	0.8358534	0.790	0.429776
EEO	-0.2545279	0.3152494	-0.807	0.419444
TP_LOCALIZACA01	0.0805697	0.6142801	0.131	0.895648
Porte_escola	0.0003005	0.0002010	1.495	0.134881
TIPO_UNIDADE1	0.5506434	0.1562918	3.523	0.000426 ***

```
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
(Dispersion parameter for binomial family taken to be 1)
```

```
Null deviance: 6090.2 on 5626 degrees of freedom
Residual deviance: 5562.5 on 5592 degrees of freedom
(2 observations deleted due to missingness)
AIC: 5632.5
```

```
Number of Fisher Scoring iterations: 4
```

Model 2

```
> summary(Model2)
```

```
Call:
```

```
glm(formula = Leavers ~ ., family = binomial(logit), data = BaseFinalLeav)
```

```
Deviance Residuals:
```

```
      Min       1Q   Median       3Q      Max
-1.6153 -0.4494 -0.3554 -0.2072  3.0923
```

```
Coefficients:
```

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-2.585e+01	6.762e+02	-0.038	0.96951
TP_SEX01	3.153e-01	1.738e-01	1.814	0.06962 .
cor_raca0	1.275e+01	5.685e+02	0.022	0.98211
cor_raca1	1.282e+01	5.685e+02	0.023	0.98201
cor_raca2	1.281e+01	5.685e+02	0.023	0.98202
faixa_etaria1	1.257e+00	7.043e-01	1.786	0.07418 .
faixa_etaria2	-1.892e-01	1.441e-01	-1.312	0.18946
faixa_etaria3	-9.530e-02	1.250e-01	-0.762	0.44591
faixa_etaria5	4.156e-01	1.584e-01	2.623	0.00871 **
formacao1	7.297e-01	4.426e-01	1.649	0.09925 .
formacao2	-2.285e-01	4.476e-01	-0.511	0.60966
formacao3	1.338e-01	3.662e-01	0.365	0.71495
formacao4	-4.670e-02	3.328e-01	-0.140	0.88839
formacao5	-7.307e-02	3.345e-01	-0.218	0.82707
TIPO_CONTRATO1	-1.679e+00	1.200e-01	-13.988	< 2e-16 ***
N_redes	2.546e-01	3.138e-01	0.811	0.41730
N_escolas	-9.611e-01	1.655e-01	-5.807	6.38e-09 ***
N_turmas	1.115e-01	9.312e-02	1.197	0.23122
Aluno_por_turma1	-2.269e-01	3.146e-01	-0.721	0.47077
Aluno_por_turma2	-1.212e-01	2.639e-01	-0.459	0.64600
Aluno_por_turma3	-1.512e-01	2.218e-01	-0.682	0.49544
Aluno_por_turma4	-2.371e-01	1.968e-01	-1.204	0.22842
N_matriculas_por_docente	-7.086e-03	3.527e-03	-2.009	0.04451 *
Turma_noturna0	-1.224e-01	4.381e-01	-0.279	0.78001
creche0	4.263e-01	2.277e-01	1.872	0.06120 .
pre_escola0	3.851e-02	1.693e-01	0.227	0.82006
EF10	2.373e-01	1.519e-01	1.562	0.11831
EF20	1.772e-01	1.759e-01	1.007	0.31377
EM0	8.756e-01	7.889e-01	1.110	0.26705
EJA0	6.361e-01	4.101e-01	1.551	0.12090
EPO	1.188e+01	3.662e+02	0.032	0.97412
EE0	-2.910e-01	4.401e-01	-0.661	0.50848
TP_LOCALIZACA01	-2.197e-01	7.081e-01	-0.310	0.75631
Porte_escola	2.709e-04	3.049e-04	0.888	0.37434
TIPO_UNIDADE1	1.947e-01	2.337e-01	0.833	0.40470

```
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
(Dispersion parameter for binomial family taken to be 1)
```

```
Null deviance: 3393.5 on 5626 degrees of freedom
```

```
Residual deviance: 2937.5 on 5592 degrees of freedom
```

```
(2 observations deleted due to missingness)
```

```
AIC: 3007.5
```

```
Number of Fisher Scoring iterations: 14
```

Model 3

```
> summary(Model3)
```

```
Call:
```

```
glm(formula = Movers ~ ., family = binomial(logit), data = BaseFinalMov)
```

```
Deviance Residuals:
```

```
      Min       1Q   Median       3Q      Max
-1.8945  -0.5603  -0.4283  -0.3339   2.6233
```

```
Coefficients:
```

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-1.1036343	1.7849758	-0.618	0.536384
TP_SEX01	-0.0599588	0.1297867	-0.462	0.644096
cor_raca0	-2.1891750	0.8869128	-2.468	0.013575 *
cor_raca1	-1.9233041	0.8832862	-2.177	0.029448 *
cor_raca2	-1.9498018	0.8832996	-2.207	0.027286 *
faixa_etaria1	0.1167851	0.8245436	0.142	0.887367
faixa_etaria2	0.4139754	0.1127219	3.673	0.000240 ***
faixa_etaria3	0.2545248	0.1033706	2.462	0.013807 *
faixa_etaria5	-0.0297053	0.1636905	-0.181	0.855997
formacao1	0.0591498	0.4166907	0.142	0.887118
formacao2	-0.3036452	0.3898718	-0.779	0.436078
formacao3	-0.0583866	0.2982791	-0.196	0.844810
formacao4	0.0817527	0.2544278	0.321	0.747968
formacao5	-0.0211425	0.2567622	-0.082	0.934374
TIPO_CONTRATO1	-1.2804717	0.1131903	-11.313	< 2e-16 ***
N_redes	-0.6609616	0.1631485	-4.051	5.09e-05 ***
N_escolas	1.0586095	0.0812701	13.026	< 2e-16 ***
N_turmas	0.0341470	0.0488129	0.700	0.484210
Aluno_por_turma1	-0.0204823	0.2642921	-0.077	0.938227
Aluno_por_turma2	0.0088474	0.2211219	0.040	0.968084
Aluno_por_turma3	0.2389089	0.1868994	1.278	0.201152
Aluno_por_turma4	0.1013606	0.1611808	0.629	0.529439
N_matriculas_por_docente	-0.0018157	0.0016721	-1.086	0.277528
Turma_noturna0	-0.1939881	0.2064012	-0.940	0.347290
creche0	-0.2299015	0.1623240	-1.416	0.156684
pre_escola0	0.0107071	0.1227525	0.087	0.930493
EF10	-0.0474633	0.1071838	-0.443	0.657895
EF20	-0.4233039	0.1261181	-3.356	0.000790 ***
EM0	0.1959144	0.2654542	0.738	0.460493
EJA0	0.3065189	0.2098141	1.461	0.144041
EPO	0.4825191	0.8232517	0.586	0.557799
EE0	-0.1358134	0.4025150	-0.337	0.735806
TP_LOCALIZACA01	0.7401001	1.0580452	0.699	0.484241
Porte_escola	0.0003795	0.0002400	1.581	0.113918
TIPO_UNIDADE1	0.6727015	0.1863010	3.611	0.000305 ***

```
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
(Dispersion parameter for binomial family taken to be 1)
```

```
Null deviance: 4598.0 on 5626 degrees of freedom
```

```
Residual deviance: 4171.5 on 5592 degrees of freedom
```

```
(2 observations deleted due to missingness)
```

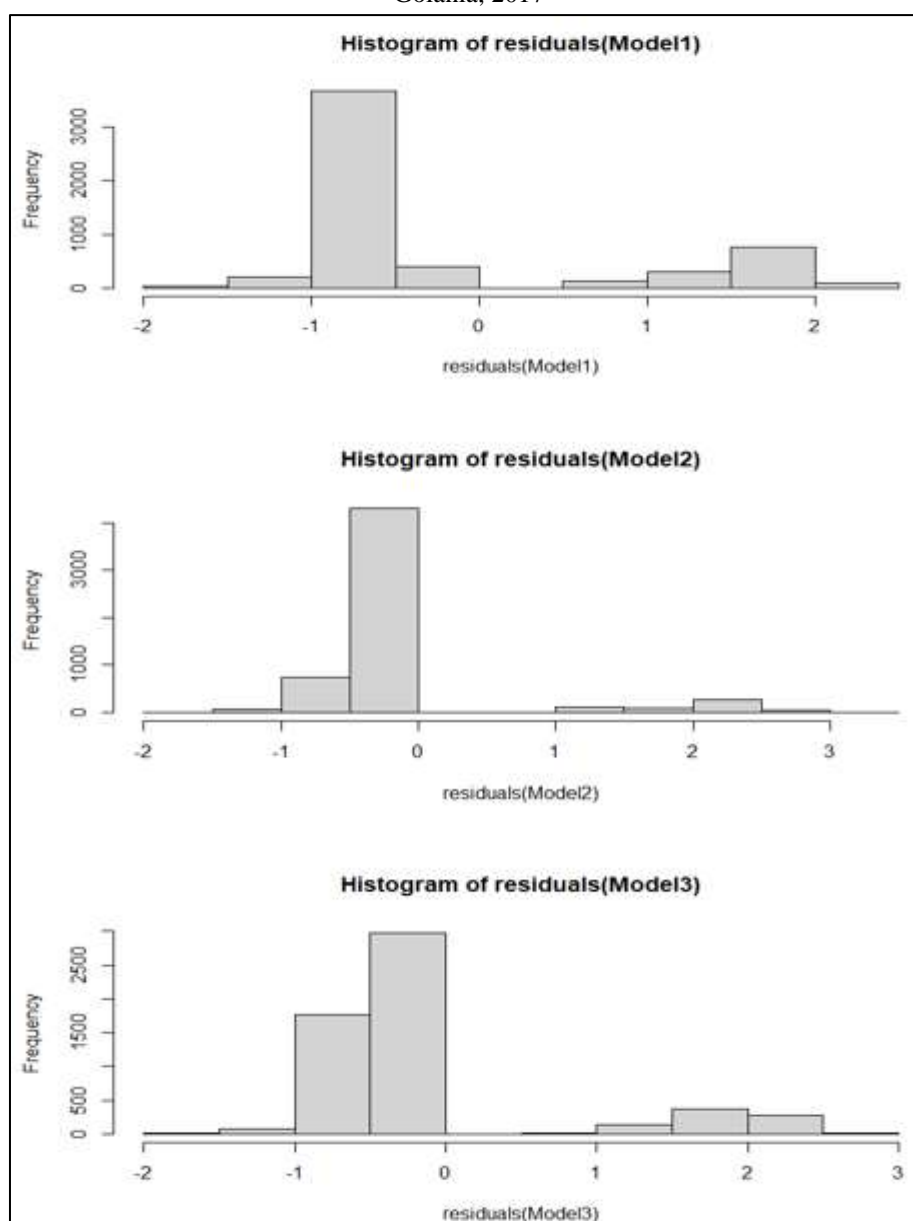
```
AIC: 4241.5
```

```
Number of Fisher Scoring iterations: 5
```

Appendix 2 – Other Statistics Details

The histogram is a quick way to study the distribution of a variable or a model. The histograms below (Graph 3) allow us to analyze observations on the phenomenon in the three regression models. In the histograms of these models, we found that the models were strongly tilted to the right, so it is a skew to the right. In addition, during this distribution, model 1 and 3 had almost the same highest distribution frequencies, that is, higher than 3,000; then comes model 2 which has the lowest frequency bar, that is, more than 2,500 and which is based on the predictors of the teachers who left the profession.

GRAPH 3 – Histogram of Regression Models of Teacher Turnovers in Municipal Network of Goiania, 2017

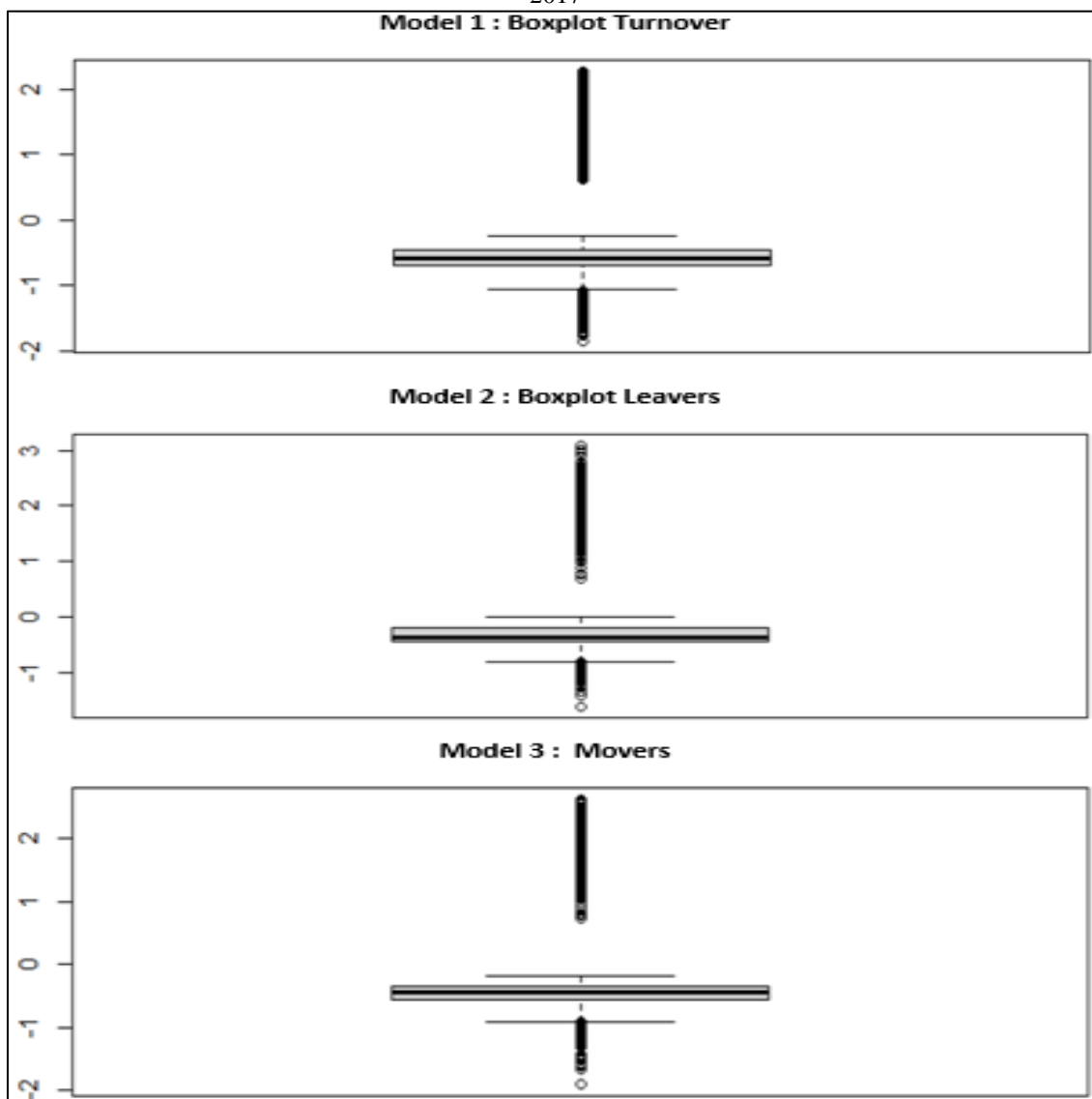


Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)

On the Boxplot, we have several pieces of information that we will use to study the models. We presented the Boxplot of the three models: the first one is based on the general situation of teacher turnover, the second one on the teachers who left the schools, and the last one on those who migrated to other schools during the period. Regarding the Boxplot groups, all three models have the same level of median mean placed in the middle.

Concerning the shift between mean and median of the three models, we observed that it is in all three models, which shows that a greater part of the points is far from their median, which is a less concentrated distribution. The more dispersed the data, the greater the interquartile range, which is noticed with the size of the box. In other aspects, in the models have extreme points that are in all the upper and lower extremes.

GRAPH 4 – Boxplot of Regression Models of Teacher Turnovers in Municipal Network of Goiania, 2017



Source : Elaborated by the Author from Dados de Censo Escolar / INEP (2016 and 2017)