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RESIGNIFYING THE LICENSED PROFESSIONAL IN GRAPHIC EXPRESSION OR WHERE IS MY DRAWING TEACHER?

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Abstract: A graduate in graphic expression is a professional qualified to teach Geometry in basic education. Currently, the contents of Geometry are included in the mathematics program of Brazilian basic education, however, studies reveal that, despite the contribution of the area to the development of the individual, such contents have not been addressed effectively by mathematics teachers. On the contrary, we have a course whose management is always attentive to emerging needs and works so that partnerships are made between all actors, through permanent dialogue. Thus, leveraged by technological advances, the process of resignification of this professional has been carried out in a joint action with students and graduates in constant search for improvement.
Keywords: Degree in graphic expression, Graphic Geometry, basic education, digital modeling, resignification.

UNDERSTANDING THE REFRAMING PROCESS AND ITS APPLICABILITY

To ressignify is a transitive verb that refers to the act of giving a new meaning to something or someone. It is related to the process of resignification (a word that is not recognized in the orthographic vocabulary of the Brazilian Academy of Letters - ABL), a method of neurolinguistics, widely used in psychology and psychoanalysis, which allows people to give new meanings to life events, from their change of perception of the world.

Although not recognized by the ABL, the word resignification has become a commonplace in many fields of knowledge (architecture, visual arts, cinema, design, music, etc.) and has come to be considered a fundamental element in the creative process, where the ability to attribute new importance to everyday situations becomes useful and gives people pleasure.

For the communication area, for example, the act of resignifying has very different meanings depending on the context in which it is manifested. Normally, based on cultural resignification, for example, new functions and interpretations can be assigned to works of art, music, movies, games, fashion, etc.

Oliveira (2011) when analyzing poetic verses by Carlos Drummond de Andrade (1984) and Guimarães Rosa (1988) assumes that the concept of resignification emerged early, but continues to have repercussions. According to the author, in the epigraphs she selected for analysis

> [...] the authors seem to speak of a struggle with memory, of what remains echoing in our psyche, and of the desire to attribute new meaning to what has already been lived [...], the freudian *nachträglich*. (OLIVEIRA, 2011, p. 127-8).

In the article Estudos de Psicanálise, Pimenta (2014) assures that the term *nachträglich*, although it was inherited from the traumatic theory of neuroses, it first appeared in the account of the Emma case, investigated by Freud in 1895, and presented in the chapter entitled^: *Próton pseudos* of the book: ''Projeto para uma Psicologia Científica" ('Project for a Scientific Psychology), published in 1950. The author goes on to say that a traumatic scene does not find meaning in itself, that is, it only becomes traumatic when, transformed into a representation or memory, being evoked by a second scene that must suggest something new, capable of to attribute to the first memory a meaning that had not been given to it.

In view of the contributions that the process of resignification has led to various areas of knowledge and considering that the Degree in Graphic Expression (LEG) has undergone a reform in its Pedagogical Project (of course), this article discusses the possibility of re-signify the profession of this graduate: the former teacher of Geometry (geometric design) who worked in basic

education in an effective and mandatory way until the implementation of Law No.

We know that the expansion of higher education presupposes the improvement of the efficiency of the educational system, particularly of federal institutions, which are, in principle, a reference in the Brazilian system. Today, higher education institutions are assuming their social responsibility, as they are concerned with the training of professionals more suited to the needs of the market and, mainly, with the role of the University in the society of the 21st century, which requires a paradigm shift.

Society has been demonstrating the need for a higher-level professional who has a more complete and complex training, not only specific in his area, but who respects ethical, humanistic, cultural and sustainable standards, who can work together with related areas in multidisciplinary teams. Thus, courses aimed at teacher training need to train professionals capable of promoting interaction between parts of a system and with the skills to generate changes in the communities in which they work, with the ability to critically analyze the processes of transformation of society.

THE DEGREE IN GRAPHIC EXPRESSION

The undergraduate course in Degree in Graphic Expression (LEG) at the Federal University of Pernambuco is located at Campus Joaquim Amazonas, located in the city of Recife, and has its physical facilities at the Center for Arts and Communication. Its curriculum gives it a unique character, despite this, it is not a new course: its origin dates back to the Professorship in Drawing course at the University of Recife (created in May 1951, with enrollment starting in February of the following year), based at the School of Fine Arts.

On March 20, 1961, the course for Professorship in Drawing was renamed Course of Degree in Drawing and Plastics (being recognized through Opinion nº59/1961 of the Ministry of Education - MEC), in an attempt to conquer a more broad, which would attract better candidates for the entrance exam, thus absorbing the Painting and Sculpture higher education course, which had been operating without MEC recognition, for many years, at the School of Fine Arts.

The enactment of Law nº 5.692/71, of the Federal Council of Education, brought different interpretations regarding the obligatoriness of the Geometric Design discipline in Basic Education. This law defined that school contents must be gathered in common nuclei (conceived differently for each grade, based on the methodological treatment they must receive), composed of a group of subjects that, necessarily, must be included in the full curricula of 1st and 2nd grade. 2nd grades (currently elementary and high schools), nationwide, and a diversified part, to meet the peculiarities and local needs of educational establishments.

Concomitantly with the changes that this law established for basic education, the MEC tried to unify the degree courses in higher education. They created the "Bachelor of Arts Education", which had a multipurpose training (lasting 2 years) and another, specific (lasting 2 more years), covering the areas of "Music", "Theater", "Plastic Arts " and "Drawing", resulting in the deactivation of the "Degree in Drawing and Plastics" course.

However, for various reasons, whether in the sense of not having a demand or because it was not possible to train 'the desired multipurpose teacher', from the 1980s onwards, the old specific degrees were restored. Thus, in 1983, UFPE reactivated the Licentiate in Design and Plastics (LDP) course. Until it was changed to LEG, the LDP course underwent

two reforms in its curricular profile: in 1993 (valid for students from the first semester of 1994) and in 2000 (valid for students from the first semester of 2001). In 2006, considering the need for curricular adaptation of the Licentiate Courses to the Resolutions of the National Council of Education approved in 2002, 2004 and 2005, which instituted and disciplines the National Curricular Guidelines for the Training of Basic Education Teachers at a higher level, UFPE approved an internal resolution that dealt with procedures related to the integral and partial curricular reform of all the institution's degree courses, and met the recommendations of the UFPE Graduate Forum regarding the curricular structures of these courses, contemplating the contemporary institutional and social context.

This curriculum adaptation took four years to be implemented: there were many collegiate meetings until a common denominator was reached. The reflection on the training of the professional that the course must train necessarily permeated the Pedagogical Project and covered not only scientific issues. In view of this, and also, due to the constant and profound social transformations, the Collegiate (of the course) understood that there was a need to reformulate the curricular structure of the Degree in Design and Plastics. Due to the depth of the changes, the Collegiate started the process of extinguishing the LDP and, simultaneously, the implementation of the LEG. Thus, after a procedure started in 2006, the Degree in Graphic Expression came into effect in the first half of 2010, whose profile of the licensed professional was more focused on Graphic Geometry and its applications and, therefore, more adapted to the reality and demands in force in that period: after Resolution CNE/CEB nº 1, of February 3, 2005, which instituted the inclusion of Technical Education in Basic Education. Thus, the integrated secondary education defined as "Professional Education at a technical level" became known as "Professional Technical Education at a secondary level", representing a promising and important field of work for graduates in Graphic Expression, that is, training in LEG would be suitable for those interested in integrating the teaching staff of State Technical Schools (ETE's) and Federal Institutes of Education, Science and Technology (IF's).

In the first half of 2013, in order to serve the job market represented by Technical Education, a new curricular profile was started (in force until 2019) that sought to improve and make the identity of the LEG course more flexible, allowing the student to choose between five axes of deepening: (1) Visual Arts; (2): Architecture; (3) Design; (4) Engineering, and (5) Computational Technologies.

Since then, specifically, both the Course Collegiate and the Structuring Teaching Nucleus (NDE) have been discussing the profile of the professional we must train. We understand that the training of a teacher is a double responsibility, on the one hand we are concerned with learning the specific content of the area of Graphic Expression and, on the other hand, there is a concern with the training of a teacher, which must be, invariably associated with a humanistic character, with social and ethical responsibility in the professional posture, especially because this professional will work in Basic Education, that is, with children, adolescents and young adults.

With a specific focus on Graphic Geometry and its applications, the profile in force at LEG until the current year aims to characterize a graduate with more flexible attributes and adapted to the context of society. Graphic Geometry, by the way, is the guiding thread that supports the student throughout the course. The same Geometry that, in the

course of its history, has gone through several crises both in its foundations and in the way society sees and studies it. We know that understanding these events in the past is a way of understanding problems in the present and of seeking solutions for them, that is, having this understanding is part of the process of resignifying the professional who teaches(w) drawing.

WHY STUDY GEOMETRY?

It is common for beginning undergraduate students in the Degree in Graphic Expression (LEG) to question: "why is the course physically installed at the UFPE Arts and Communication Center (CAC), since it is Geometry (a so-called knowledge of exact sciences) that guides the entire course?". This questioning, at first, so simple permeates complex discussions that bring with it the understanding of the theoretical framework of the course, that is, the articulated body of concepts of different levels of abstraction (general assumptions, specific concepts, etc.) that guided the conception of the LEG (2010) and have been guiding the curricular reforms that the Structuring Teaching Nucleus (NDE) of the course has proposed in a collective action with graduates.

Although Law nº 5.692, of August 11, 1971, is directly linked to the depreciation of the study of Graphic Geometry (drawing, geometric design) in Brazilian basic education, this depreciation is not the exclusive result of this law. The importance of the study of Geometry for human formation has not been presented widely, in order to show its importance in the various areas of both scientific and social knowledge.

The study of Graphic Geometry develops skills related to spatial intelligence such as: visual motor coordination, visual memory, visual discrimination, perception of position in space, among others (FROSTIG and HORNE, 1964; HOFFER, 1977; FOSTIG, HORNE and MILLER, 1980; GARDNER, 1994). According to psychology (PIAGET, 1967), since the content of geometric design is not taught or worked with children aged 7 to 12 years, they are losing a cognitive moment conducive to such learning. However, these skills can be developed late, however, there is a risk that they will never be fully developed.

We live in a society of an excess of images, information, that is, we live hyperattentive. For Byung-Chul Han (2017, p.33), hyperattention is "this dispersed attention that is characterized by a rapid change of focus between different activities, information sources and processes". In fact, our gaze is used to this excess and can no longer stop and contemplate. There is no longer a deep attention, because society has led the individual to do thousands of things at the same time and, with that, we have a superficial look, because our attention is divided between different demands. This time, I assure you that "Learning to See" has become increasingly important in the contemporary world, not only for the discipline of Geometry, but for a large part of our daily activities.

In the construction of geometric thinking, the gaze has an important role that was previously attributed only to the characterization of the geometry of shapes. An important issue in the learning of Geometry, particularly in the first grades of elementary school, is how to make the transition from this look, which recognizes and differentiates shapes, to the identification of these shapes (TEIXEIRA, 2008).

Research on the learning of Geometry in elementary school (KALEFF, 1994; LORENZATO, 1995; PAVANELLO, 1993; PEREZ, 1995) observed the deficiency in the application of the contents of Graphic Geometry. In these researches, several reasons were pointed out to explain this lack, such as: the scarcity of didactic material, the

release of teaching and the lack of qualified teachers. The theory of levels of geometric thinking, authored by Dutch educators Pierre M. Van Hiele and Dina Van Hiele Geoldof (Van Hiele couple), was very significant for these researches, as it describes the thought processes used in the geometric context.

For the Van Hiele couple (1984), the space dedicated to Geometry contents in Mathematics and Arts subjects does not supply the time or depth of the contents necessary for students to develop geometric thinking. Consequently, these students arrive at higher education with skills at a lower level than expected.

Currently, within the discipline of Mathematics, schools work on geometry by deducing formulas and solving exercises, which results in a very mechanical work. As a result, students get confused in carrying out the activities and do not understand the contents and concepts of the same. Due to the fact that it presents a number of formulas, students are not able to visualize the objects or make a relationship with those around them.

In the case of Geometry content in the Arts disciplines, the dilemmas are different: there is not such a gradual and continuous evolution of subjects, as the discipline needs to supply other areas of knowledge in addition to the visual arts, such as theater, music, dance.

The National Curriculum Parameters (PCN) highlight the importance of this branch of mathematics that also serves as a tool for other areas of knowledge. The student develops a special type of thinking that allows him to understand, describe and represent, in an organized way, the world in which he lives.

> [...] T work with geometric notions contributes to the learning of numbers and measures, as it encourages the child to observe, perceive similarities and differences, identify regularities and vice-versa. In addition, if this work is done from the exploration of objects of the physical world, works of art, paintings, drawings, sculptures and crafts, it will allow the student to establish connections between Mathematics and other areas of knowledge (BRASIL, 1997, p. 39).

This situation represents a loss of the possibility of learning important and necessary skills not only for the study of Geometry and the areas of knowledge that use this knowledge - as is the case of the areas of Engineering, Architecture, Graphic Expression, Design and Visual Communication – as well as for everyday life, by providing the individual with the development of spatial perception skills, for example, knowing where to locate in a known or unknown space, reading maps, interpreting and comparing images, having notions of distance and proportion, develop visual-motor coordination, among others. Nacarato and Passos (2003, p. 29) point out that "it is increasingly essential for people to develop the ability to observe three-dimensional space and to develop ways of communicating about it, as the image is an essential information instrument. in the modern world".

In addition, depending on how geometric concepts are worked, there are many possibilities for the student to explore, represent, construct, discuss, investigate, perceive, discover and describe properties, which is fundamental in the process of teaching and learning mathematics. Thus, Geometry can contribute to the development of the ability to abstract and generalize.

In the research "Students' mathematical whys and teachers' answers", Lorenzato (1993) submitted 255 teachers, with more than 10 years of experience in elementary education (initial years), to eight questions (proposed by students) referring to Geometry Euclidean plane. No question was correct: there were 2040 wrong answers. Of the total number of teachers consulted, only 8% admitted that they tried to teach Geometry content

to students. Lorenzato (1993) concludes the research by stating that the teacher who does not know Geometry also does not know the power, beauty and importance that it has for the formation of the future citizen, so, for these teachers, the dilemma is to try to teach Geometry without knowing it or else don't teach it.

Considering the exhibitions throughout this section, we affirm that being physically inserted in the Center for Arts and Communication does not place us as an arts course, but refers us to being a course that works with the graphic language conferred by the science of Geometry, that is, the LEG course is at CAC for being communication. In this sense Luz in his article says:

> To draw as a science that integrates knowledge is one of the philosophical and epistemological supports that can decisively contribute to human formation, taking it to the classroom, integrating knowledge will be rescuing the critical thinking of high school and elementary school students. When you think critically, you can solve problems in any area. There are no limits to thinking. An example of this was the first ecological themes developed by Hippocrates and Aristotle, both considered great geometers, philosophers and thinkers. (LUZ, 2005, p. 23).

RE-SIGNIFYING THE LICENSED PROFESSIONAL IN GRAPHIC EXPRESSION

In the article "Why not teach Geometry?", when discussing the Geometric Omission, Lorenzato (1995) describes some causes for the chaotic situation in the teaching of Geometry in Brazil:

> One of them is the curriculum (understood minimally as a set of disciplines): in our teacher training courses, which enable the teaching of Mathematics or Didactics of Mathematics (Bachelor in Science, Mathematics, Pedagogy and Training for the Teaching), Geometry has a very fragile position, if any. Now, as nobody can teach well what they don't know, there is one more reason for the current geometric oblivion (LORENZATO, 1995, p. 4).

Note that the article is more than twenty years old and is still current, because, currently, with the exception of the Degree in Graphic Expression (UFPE) and the Degree in Drawing (UFRJ), the teacher training courses that enable the professional to teach Geometry for basic education are: Pedagogy (kindergarten and early years of elementary school), Licentiate in Mathematics (elementary and high school), Licentiate in Natural Sciences and Mathematics (elementary and/or high school, depending on the specific qualification chosen). However, with few exceptions, Geometry has not existed in basic education as a specific subject. Its content has been diluted in the mathematics discipline and, unfortunately, the scenario has not changed since the research carried out by Lorenzato, in 1993.

Precisely because the discipline of Geometry or Geometric Design is not mandatory in Brazilian basic education, the process of Re-signification of the licensed professional in Graphic Expression is necessary. Other factors that contribute to the realization of this process are: the speed of technological advances and the understanding of emerging needs.

In relation to technological advances, many opportunities have arisen: for example, it is known that drawing (manual graphic representation) has always been the main support of graphic language, however, currently, this support also occurs through digital representation with the use of graphics software. Increasingly, information and communication technologies have positively interfered in the area of graphic representation, and modeling tools have enabled more integrated methods between

the different areas responsible for the digital representation process.

A new LEG curriculum profile is being built. The current version of the Pedagogical Project of the Course (2022) has been structured by the NDE, which has guided its discussions in accordance with the precepts of the Law on Guidelines and Bases for National Education (Law No. No. 02 of June 1, 2015 of the National Education Council (revoked by Resolution CNE/CP No. 02, of December 20, 2019) and the New Curricular Common Base (BNCC/MEC, 2017). Without forgetting Law No. 13.005/2014 (PNE 2014-2024) which defines the payment of at least ten percent of the total curricular credits required in undergraduate courses, through Extension programs and projects in areas of social relevance. This profile has bolder specific disciplines based on current technological trends. It is true that the production of artifacts in the LEG course has undergone changes since the previous curriculum profile (in force until 2019), with the popularization of technologies such as laser cutting and 3D printing. Regarding production methods, Celani and Pupo (2008) state that the old ones were intended to mass manufacture identical copies of the same product, unlike the new ones, based on digital models, capable of manufacturing a large number of different forms. In his course conclusion work, Silva (2019) presents two of these new production methods used in Grea3D (Group of Experiments in 3D Artifacts), the Rapid Prototyping and Digital Fabrication Laboratory, equipped with four 3D printers, six computers and a laser cutter that is part of the physical structure of LEG.

Regarding the understanding of emerging needs, we can say that the theoretical and methodological foundations of active and innovative teaching (empathy, engagement, creativity and microlearning; prototyping and maker culture; project and problem-based learning; mobile learning; augmented and virtual reality; etc.), as well as guiding principles of Specialized Educational Assistance (AEE.) guided the pedagogical reform proposed in the new edition of the course's PPC. The AEE is a special education service that identifies, elaborates, and organizes pedagogical and accessibility resources, which eliminate barriers to the full participation of students, considering their specific needs (BRASIL, 2008).

In a country as controversial as Brazil, working on the resignification of a teaching professional is a priority action that needs to go beyond the limits of the university, that is, it is necessary that the activities developed at LEG reach society. The lack of such disclosure has even been a negative thing for professionals trained in the course, who miss interesting opportunities, such as, for example, not being able to compete in public tender notices aimed at professionals with innovative qualities, since LEG rarely appears in these edicts.

SOME CONSIDERATIONS ABOUT TEACHER TRAINING

The educational process must be continually reviewed to adapt to the need for training citizens who are able to understand and intervene in the socio-economic reality of their time and place in which they live. The university needs to review its structures in order to train professionals adapted to the needs of the current moment and what is expected in the future. Graduation is no longer an end. Education is continuous and the greatest value of each stage is in preparing a professional with quality and able to learn more and more.

The contribution to the permanent improvement of society's quality of life is a function of the university as an appropriate

Figure 1 – Laboratory: Grea3D.

Source: GALVÃO, Thyana Farias Galvão et al. Pedagogical project of the Degree in Graphic Expression, Federal University of Pernambuco, Recife, 2019.

Figure 2 – Work developed by LEG students using the laser cutter.

Source: Graphic Expression Courses use a multidisciplinary approach and rapid prototyping (Available at: http://grea3d.expressaografica.pro.br/noticias/)/

space for thinking and producing knowledge. With this, it trains professionals who must act in favor of meeting the various demands that arise daily, in the establishment of their duties and in respect for the rights of all. Among these professionals that universities form are teachers from all areas of knowledge, who will participate in the education of future generations. These professionals will have the responsibility of helping to form citizens more aware of their role as agents of (re) construction of social relations. Therefore, it is essential that the training of these future teachers guarantees them the construction of knowledge from the production of critical-reflective thinking, because only then will these future teachers be able to adequately experience their professional activity, in order to contribute to the realization of a society more democratic, tolerant and just.

REFERENCES

BRASIL. Ministério da Educação. Secretaria de Educação Fundamental. **Parâmetros curriculares nacionais: matemática** PCN. Brasília: MEC/SEF, 1997.

BRASIL. **Política Nacional de educação especial na perspectiva da educação inclusiva**. Brasília, DF, 2008.

CELANI, Gabriela; PUPO, Regiane Trevisan. **Prototipagem Rápida e Fabricação Digital para arquitetura e construção: Definições e estado da arte no Brasil**. In: Caderno de Pós-graduação em Arquitetura e Urbanismo. São Paulo: 2008.

FREUD, Sigmund. Projeto para uma psicologia científica (1950 [1895]). In: **Publicações pré-psicanalíticas e esboços inéditos** (1886-1889). Direção-geral da tradução de Jayme Salomão. Rio de Janeiro: Imago, 1996. p. 355-450. (Edição standard brasileira das obras psicológicas completas de Sigmund Freud, 1).

FROSTIG, Marianne; HORNE, David. **The Frostig program for the development of visual perception**. Chicago: Follett Publishing Co., 1964.

FROSTIG, Marianne; HORNE, David; MILLER, Ann-Marie. **Figuras e formas: programa para o desenvolvimento da percepção visual**. Guia para o professor: níveis elementar, intermediário e adiantado (suplementado por cadernos dos três níveis). Trad. Leonor Scliar Cabral, Buenos Aires. São Paulo: Panamericana, 1980.

KALEFF, Ana Maria Martensen Roland. **Tomando o ensino da Geometria em nossas mãos...** A Educação Matemática em Revista. SBEM, n. 2, p. 19-25, 1994.

GALVÃO, Thyana Farias. **Ressignificando o profissional Licenciado em Expressão Gráfica ou por onde anda meu Professor de Desenho?** Graphica: XIII International Conference on Graphics Engineering for Arts and Design (13:2019: Rio de Janeiro).
HAN, BYUNG-CHUL. **Sociedade do cansaço**. 2ª edição ampliada. Petrópolis: Ed. Vozes, 2017.

HOFFER, Alan R. **Mathematics Resource Project: Geometry and Visualization**. Palo Alto, Calif.: Creative Publications, 1977.

LORENZATO, Sergio. **Por que não ensinar Geometria?** A Educação Matemática em Revista, Blumenau: SBEM, v. 3, n. 4, p. 3-13, 1995.

LORENZATO, Sergio. **Os "porquês" Matemáticos dos Alunos e as Respostas dos Professores**. Proposições, vol. 10, Faculdade de Educação, UNICAMP, Campinas, 1993.

LUZ, Adriana Augusta Benigno dos Santos, et al. **Uma abordagem filosófica para o ensino da Geometria na disciplina de matemática nas escolas da rede pública**. Revista Educação Gráfica, Bauru, n.9, p.22-28, 2005.

NACARATO, Adair Mendes; PASSOS, Cármen Lucia Brancaglion. **A Geometria nas séries iniciais: uma análise sob a perspectiva da prática pedagógica e da formação de professores**. São Carlos: EdUFScar, 2003.

OLIVEIRA, Fátima Cristina Monteiro de. **A arte da reescritura: uma ressignificação?** J. psicanal, São Paulo, v. 44, n. 80, p. 127-140, jun. 2011. Disponível em < http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid= S0103-58352011000100011>. Acesso em 14 de março 2022.

PAVANELLO, Regina Maria. **O abandono do ensino da Geometria no Brasil**: causas e consequências. Zetetiké. Campinas, v. 1, n. 1, mar. 1993.

PEREZ, Geraldo. **A realidade sobre o ensino da Geometria no 1º e 2º graus, no Estado de São Paulo**. A Educação Matemática em Revista. SBEM, São Paulo, n. 4, 1995.

PIMENTA, Arlindo Carlos. **O tempo em Freud**. Estud. psicanal., Belo Horizonte , n. 41, p. 59-66, jul. 2014. Disponível em <http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid =S0100-34372014000100006&lng=pt&nrm=iso>. Acesso em 14 de março 2022.

SILVA, Gabriel Varela Soares da. **Expressão Gráfica: educação inclusiva a partir das contribuições para o programa das salas de recursos multifuncionais**. Trabalho de Conclusão de Curso (Graduação) – Universidade Federal de Pernambuco. Recife, 2019.

TEIXEIRA, Marta S. M. **O pensamento geométrico no 1º ano de escolaridade**. Dissertação de mestrado - Universidade de Lisboa. Lisboa, 2008.