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Special Education: Teacher training in mathematics in the context of Pedagogical Hospital Education Services in Goiás[1]

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ABSTRACT

This article aims to analyze the context of Pedagogical Hospital Education Services in the state of Goias (Brazil), and the process of training mathematics teachers working at the Center for Pedagogical Hospital Assistance in Goias (NAEH). The study is characterized by an exploratory nature, with a qualitative basis, with action research, in an integral and systemic perspective, as a method. It presents the documentary bases that guide the historical context, the policies, the organization and functioning of the services at NAEH. The training of Pedagogical Hospital Education teachers who teach mathematics, as proposed in the scope of the research, was built collectively and oriented in accordance with the demands raised in the field. The 120-hour course, brought important contributions to the pedagogical work, according to the evaluation of the participants, in addition to reflections on the quality of teaching performance in this space for inclusion.

KEYWORDS: Special education. Educational hospital and home care. Pedagogical Hospital Education Services. Hospital Pedagogical Assistance Center.

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Educação Especial: Formação de professores em matemática no contexto das classes hospitalares em Goiás

RESUMO

Este artigo elege como objetivo analisar o contexto das classes hospitalares em Goiás e o processo de formação de professores em matemática atuantes no Núcleo de Atendimento Educacional Hospitalar de Goiás (NAEH). O estudo se caracteriza de natureza exploratória, de base qualitativa tendo a pesquisa-ação, em uma perspectiva integral e sistêmica, como método. Apresenta as bases documentais que orientam o contexto histórico, as políticas, a organização e funcionamento dos atendimentos no NAEH. A formação de professores de classe hospitalar que ensinam matemática, proposta no âmbito da pesquisa, foi construída de forma coletiva e orientada em conformidade com as demandas levantadas em campo. O curso, com carga-horária de 120 horas, trouxe, segundo avaliação dos participantes, importantes contribuições para o trabalho pedagógico, além de reflexões sobre a qualidade da atuação docente nesse espaço de inclusão.

PALAVRAS-CHAVE: Educação especial. Atendimento educacional hospitalar e domiciliar. Classe hospitalar. Núcleo de Atendimento Educacional Hospitalar.

Educación Especial: Formación de profesores de matemáticas en el contexto de las clases hospitalarias en Goiás

RESUMEN

Este artículo tiene como objetivo analizar el contexto de las clases hospitalarias en Goiás y el proceso de capacitación de maestros de matemáticas que trabajan en el Núcleo de Atendimento Educacional Hospitalar (NAEH). El estudio se caracteriza por una naturaleza exploratoria, con una base cualitativa, con investigación de acción, en una perspectiva integral y sistémica, como método. Presenta las bases documentales que guían el contexto histórico, las políticas, la organización y el funcionamiento de los servicios en NAEH. La capacitación de maestros de clase hospitalaria que enseñan matemáticas, propuesta en el campo de la investigación, se desarrolló de manera colectiva y orientada, de acuerdo con las demandas adquiridas en el campo. El curso, con una carga de trabajo de 120 horas, trajo, de acuerdo con la evaluación de los participantes,

importantes contribuciones al trabajo pedagógico, además de reflexiones sobre la calidad del desempeño docente en este espacio de inclusión.

PALABRAS CLAVE: Educación especial. Asistencia educativa en el hospitaly atención domiciliaria. Clase hospitalaria.

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Introduction

This article chooses special education as a theme, and focuses on hospital and home educational care - understood as a Pedagogical Hospital Education Service - and aims to analyze the context of Pedagogical Hospital Education Services in Goias and the process of mathematics training for teachers working in the Center for Pedagogical Hospital Assistance (NAEH), an organ of the Department of Education of the State of Goias (Seduc).

The proposal of the article is part of a study on special education in the state education network, whose proposed profile emerges in the context of the studies, based on the demands of the NAEH.

The research presented is exploratory, in the sense that it seeks to complement initial knowledge, allowing for a broader and more general vision of approximation on the theme; which has a qualitative basis, in which the researcher presents himself as an observer who interacts with the subjects under study, without the search for neutrality; choosing André Morin's (MORIN, 2004) research-action method, in the integral and systemic perspectives. It is noteworthy that, although research on inclusion in the state education network started in 2013, the article is based on data collected in the period from 2018-2019.

To understand the historical context of Pedagogical Hospital Education Services, the research starts from a documentary base consisting of official sources on a local and national scope having special education policies, and MEC and Seduc's guiding documents on the subject as its central axis.

Pedagogical Hospital Education Services in Goiás: The historical, political and organizational context

In the state of Goias, 1999 was marked by the restructuring of special education and the implementation of the "State Educational Program for Diversity in an Inclusive Perspective (1999-2006)", via the Special Education Superintendence.

Based on Decree no. 3,298 / 1999, the program implements ten projects covering all inclusive actions in Goias, namely: Projeto Depende de Nós (Project "It's Up to Us") - a proposal to publicize Goias' inclusion policy with the participation of the families and the community; Inclusive School Project - a school proposal for all, using the Individualized Education Plan (PIE) which includes, among others, curricular adaptation, learning rhythms, assessment; Refazer (Re-do) Project - a service aimed at educating people with autism inside regular schools; Reference Units Project - a service unit aimed at the subjects of inclusion, their family members and the society; Walking Together Project - a project that seeks partnerships with the municipalities aiming at the municipalization of education with a view to inclusion; the Communication Project - a project with an educational proposal aimed at the hearing-impaired; The Awakening Project - aimed those with high skills; Creative Space Project - a proposal for inclusion through art as a way of building learning in regular and special education; The Prevention Project - an action to detect and prevent disabilities, carried out in partnership with agencies connected to the health field; and, finally, the Today Project - a project aimed at providing educational assistance to students undergoing health treatment with a prognosis for medium or long-term hospitalization (ALMEIDA, 2003).

In the field of Pedagogical Hospital Education Services, the first action of the Today Project was carried out in 1999, with care for children at the Araújo Jorge Cancer Treatment Hospital, in Goiânia (TEIXEIRA

et al., 2017; TEIXEIRA et al., 2019). Over time, in addition to other hospitals and partner institutions of the then State Secretariat of Education - Seduc, care began to be made available in households throughout the state of Goiás.

In 2001, the Today project was regulated by the State Education Council, through EEC Resolution n. 161, and then had its authorization renewed in 2004, provided for by EEC Resolution no. 065, and then again in 2010, by EEC Resolution no. 041, which also authorized its accreditation until 2013. In 2013, the Today Project was restructured and is now constituted as a Center for Educational Hospital Assistance (NAEH), being allocated to the Special Education Management, at the then State Secretariat of Education, Culture and Sport of Goiás (Seduce). This new composition of Pedagogical Hospital Education Services in NAEH is regulated by Official Letter no. 007/2014, whose authorization for attendance was given by means of EEC Opinion no. 267/2015, extended until December 31, 2019 (TEIXEIRA et al., 2019).

As the national special education policy (BRASIL, 2008) did not encompass students undergoing health treatment as subjects of inclusion, there was concern on the part of the special education managers in Goias that there would be a reduction in the support offered or even that it would be difficult for students enrolled to renew registration for the service. When article 4th-A in the LDB, included by Law no. 13.716 / 2018, which ensures "[...] educational assistance, during the hospitalization period, to basic education students undergoing medical treatment either in a hospital or at home for a prolonged period, as provided by the Government in regulation, in the sphere of its federative competence ", this made it possible to guarantee to these students that they would have continuity of the care provided by NAEH, in Goias.

NAEH, in line with the guiding document of the MEC (Ministry of Education) Pedagogical Hospital Education Services (BRASIL, 2002a), seeks to develop

> [...]a work proposal that aims to serve basic education students from the state education system, as well as students from other states who are undergoing treatment in Goiás and who have, at the time, transferred to and enrolled in schools in the state education system in Goias (GOIAS, 2013, p. 1).

And it aims to

> enable children, adolescents and hospitalized adults, in treatment and / or in convalescence, to start or continue their schooling, stimulating their development and making it possible to reduce the age / grade gap, dropout rates and school failure through the organization of a pedagogical work specific to this modality, offering home pedagogical care, that is, educators who go to institutions or to the homes of those students who are in special health conditions. (GOIAS, 2016, p. 3).

Pedagogical home or hospital care is provided by NAEH, to all Basic Education students, be they children, youths or adults, enrolled in the public municipal or state education network in the State of Goias, who are unable to attend regular school due to health treatment.

In the "home care" denomination, services are extended to students undergoing health care at home, in hospices, community centers or other structures that offer the minimum conditions for quality educational activities in the 246 municipalities in Goias. In-hospital pedagogical services, though serving students from all over the state of Goias (or from other states) are carried out only in the state capital, the city of Goiania. Altogether, there are ten public hospitals affiliated with Seduc that offer Pedagogical Hospital Education Services: Araújo Jorge Cancer Hospital (HAJ); Tropical Diseases Hospital Dr. Anuar Auad (HDT); Alberto Rassi Hospital (HGG); Hospital das Clinicas (HC); Santa Casa de Misericórdia de Goiânia; Goiania Emergency Hospital (HUGO); Maternal and Children's Hospital; Dr. Henrique Santillo Rehabilitation Center (CRER); Hospital of Sanitary Dermatology (HDS); and the Goiania Governador Otávio Lage Emergency Hospital (HUGOL) (TEIXEIRA et al. 2017).

In terms of the NAEH team, during the period under study, there was a great variation in the composition in the number of people and assigned functions, however, the document "Guidelines for work in the NAEH" indicates that the nucleus must be composed of a general coordinator, a secretary , a social worker, a psychologist, two pedagogical coordinators (hospital and home) and by Pedagogical Hospital Education Service teachers and home-based educational services (GOIÁS, 2014). The number of teachers varies according to the demand for services, however, during the survey, there were 80.

In order to work in Pedagogical Hospital Education Services, the aforementioned Guidelines specify a minimum requirement of an undergraduate degree, preferably in pedagogy, having a link with the state education network (effective or contract) and time availability to teach classes, participate in meetings and guidance groups, to attend psychoeducational consultations and to participate in training programs (GOIAS, 2016). Teachers' workloads can vary, consisting of 20, 30 or 40 hours per week.

For home educational assistance, according to the document, the weekly 20-hour workload corresponds to tutoring two students, four hours a day, for 3 periods in a week (one period may be related to the day of the week - Monday to Friday - and the work shift - morning or afternoon), in a regime of alternating sessions in cycles of 15 consecutive days. For the weekly 30-hour workload, the teacher must tutor three students, four hours a day, for five periods of the week, alternating in cycles of 21 days. Finally, for the weekly 40-hour workload, four students must be tutored four hours a day, but this is expanded to seven periods, with alternating sessions in 28-day cycles.

The teaching workload in hospitals, differently from that in the homes, does not set the number of students served, but the number of service periods, with four hours of classes per period. Thus, the teacher with a weekly 20-hour workload must take on three work periods; those

with 30-hour weekly loads must work five periods; and those with 40-hour loads, must work seven (GOIAS, 2016).

Curriculum and teacher training at NAEH

Teacher training is a principle guided by the Law of Directives and Bases of Education (LDB) (BRASIL, 1996), by the National Curricular Guidelines for the Formation of Basic Education Teachers (DCNs) (BRASIL, 2002b), and the Common National Curricular Base (BNCC) (BRASIL, 2017) in conjunction with the Common National Base for the Training of Basic Education Professionals (BRASIL, 2018) guided by a structure of initial and continuing teacher training.

Teaching in the hospital or home environment presents other challenges, with their own breadth and complexity, that teachers of ordinary classes in regular education in general do not face, and that are not included in their initial training, such as: an unhealthy work environment, a relationship with health professionals, inadequate and unplanned spaces for the teaching-learning process, students in a fragile situation, the recurrent death of students, among others.

In the context of Pedagogical Hospital Education Services, in specific, teacher training is a principle contemplated by the MEC document entitled "Pedagogical Hospital Education Services and Home Pedagogical Care: Strategies and Guidelines" (BRASIL, 2002a). In Goias, the training of teachers working in the Pedagogical Hospital Education Services is contemplated by the NAEH guiding documents (GOIAS, 2013; 2014; 2018) that present the required teacher profile, the continuing education process and partnerships in the context of the training actions.

In a survey carried out in order to identify the profile of the teachers working at NAEH in Goias, it was identified that, in terms of training, of the 80 teachers working in Pedagogical Hospital Education Services, 46 (57.5%) had a degree in Pedagogy; 10 (12.5%) in Portuguese; 5 (6.3%) in Physical

Education; 5 (6.3%) in Biological Sciences; 14 (17.5%) in other degrees. Although all teachers teach mathematics, due to the profile required - teaching all subjects - none said they had specific training in the area.

Even though the pedagogy courses offer good training in the area of mathematics, the role of the NAEH teacher with students in all stages of Basic Education - from Kindergarten to High School - exceeds the training skills.

Medeiros and Gabardo (2004) point out that there are few qualified professionals in the field of Pedagogical Hospital Education Services, quite the opposite, there is a shortage of specialized knowledge available to teachers involved in the work.

The subject matter that is to be covered by NAEH teachers is guided by the reference curriculum of the state or municipal education network, in accordance with the network of origin of the student being served (GOIAS, 2013; 2014). But an important element to take into account is the flexibility of the curriculum. Due to the weakened conditions of the student, the number of hours devoted to pedagogical work, the organization of classes in a multi-grade manner, as well as the environmental conditions of Pedagogical Hospital Education Services, teachers are instructed to work on the contents in an inter- and transdisciplinary way.

In the area of mathematics, the field of interest for this research, teacher training was identified as an immediate need, in view of the historical context of failure produced in schools (D'AMBRÓSIO, 2008; TEIXEIRA, 2010). Considering the challenges of teachers who teach mathematics in Pedagogical Hospital Education Services and the challenges of proposing continuing education in this context are characterized as guiding questions in this study.

Paths taken to construct the training proposal and the results

A study carried out with 33 NAEH teachers, in 2017, on issues related to the teaching of mathematics demonstrated, in essence, the pedagogical

positions of most teachers based on the memorization of mathematical formulas and procedures based on algorithms; expository classes, guided by textbook and exercise lists, in addition to great difficulties encountered in the teaching-learning process.

It is true that important points were raised in the group of teachers, such as perceiving lesson planning as an important step in the educational process, working on the mathematical content based on the students' prior knowledge, and part of the teachers had a class proposal developed based on projects, the use of fun resource material, and varied assessment strategies that take each student's progress into account, that is, through procedural assessment.

Faced with the challenge posed by NAEH professors and management team to promote mathematics training that would meet the specificity of that group's Pedagogical Hospital Education Services, we began an important research phase: continuing teacher training.

The challenges for training, in summary, consisted of special teaching situations, with teachers without proper training (in the area of mathematics and in an adverse context to the regular classrooms for regular education), with a student weakened by health treatment, a risk-filled working environment (requiring care not addressed in their initial training); with a reduced workload in relation to the student's school of origin; with a class organized in a multiseries way, with classrooms containing students of different grades and ages; based on the guidance of a reference curriculum for the public school system, but with possibilities for flexible content. It was necessary to build a course proposal that could address all of these issues.

Thus, the construction of a training program took place with the participation of all actors in the educational process, which was a means of ensuring that the particularities experienced and perceived by the teachers were included in the course.

The difficulty of promoting teacher training in the hospital context is a challenge in several ways. Fontes (2005) exposes, in this sense, the

conflicting relationship of the teacher with other health professionals, which is fragmented whilst it should be integrated. In another study, Fontes (2006) points out that the teacher has a primary role in reframing the hospital environment, making it more humane and conducive to the teaching-learning process.

Another challenge concerns the environmental issue, a characteristic linked to the field of occupational health. Among the studies on this issue, we highlight Branco's (2008) on the high rate of teachers who work in the hospital environment suffering from Burnout syndrome, indicated by Monteiro et al. (2013, p. 369) as a mental illness which is "multidimensional and associated with chronic work-related stress that affects workers who deal directly with people".

For the construction of a NAEH teacher training proposal, such issues had to be taken into account.

For the collective construction of the proposal, five meetings were held with the presence of NAEH teachers and managers. The purpose of the meetings was to discuss and design what we call the Training Project for the course. The referred project included readings for further study, pedagogical resources, themes of interest, content covered, methodologies and didactic-pedagogical strategies and evaluation. After being considered by all involved, it was approved unanimously.

The course, thus proposed, with a workload of 120 hours, was registered as an extension project by the Faculty of Education of the Federal University of Goiás and counted on the participation of 50 NAEH teachers and presented as its objective to

> Make it possible for teachers to experience a training proposal that delves deeper into themes related to the teaching-learning process of mathematics in the hospital / home context; discussions on pedagogical methods, techniques, strategies and procedures for teaching mathematics; pedagogical advances in the approach to content in the area of mathematics, in an inclusive perspective, which provides effective and meaningful learning through concrete and practical tasks for, according to

> Libaneo (1994), a conscious assimilation of knowledge, skills and habits directed by the teacher.
> It proposed as a basic principle the individual and collective exploration of contents that are: a) factual, through experience of the main facts, characters and historical issues; b) conceptual, based on the exploration of problem-situations and everyday situations, enabling the construction and perception of definitions and concepts of its own and of researchers; c) procedural, based on the collaborative construction of the mathematical procedures necessary to solve the proposed problems and questions; and, as Demo (2002) explains, d) attitudinal, through the critical and creative formation of the historical and competent subject.

The course was established in a semi-face-to-face format, with ten face-to-face meetings, of six class hours each, and ten remote ones. As back-up to the training program, an institutional blog was developed with the specific purpose of training. In this blog, all training materials, complementary and supplementary readings, proposed activities and exercises, activity plans and guidelines were made available. The meetings were organized according to the generator theme, which triggered and guided all discussions, content and activities.

The generating themes, content and resources addressed at the meetings were: 1st and 2nd meetings, "Fun in mathematics classes". Contents covered: numbers and operations (additive and multiplicative principle, mental calculation, problem solving); proportionality (quantities and measures); plane geometry (principles, bases and operations); Arithmetic and Geometric Progression (structure, principles and operations); building the logic of the numbering system with other bases; numerical operations on natural, integer and rational numbers; exponential function and geometric progression; logical reasoning, mental calculation. Material resources explored: Traditional games (board, cards); manipulable materials (Montessori Golden Material, Cuisenaire Rods, Logic Blocks, geoplane), Japanese Aboban Soroban, Egg and Ball Cart, Hanoi Tower, Bowling, Password.

3rd meeting, “Mathematics and technologies”. Contents covered: Arithmetic: even and odd numbers, prime and compound, multiple and divisors, numeric expressions. Function: affine, quadratic, exponential and logarithmic. Plane geometry: circumference and circle, angles, metric and trigonometric relations, polygonal and polygons, perimeter and areas. Material resources explored: Calculator: basic (pocket), scientific and financial. Computational technologies: Spreadsheets. Softwares: Witch's numbers game[4] (initial years of elementary school); Geogebra (final years of elementary and high school). Use of video in the classroom.

4th meeting, “Mathematics and literature”. Contents covered: History of Mathematics: knowledge of historical facts that contributed to the development of mathematics through literature. Justification of concepts, applications and uses of different approaches to mathematical content, principles and bases. Material resources explored: Literature in the area of mathematics (The calculating man, Malba Tahan; The devil of numbers, Hans Magnus Enzensberger; Fermat's last theorem, Simon Singh); Literature from other areas with pedagogical direction in mathematics (Several literary works).

5th meeting, “Presentation of the results of the activities developed with the course participants, organized in working groups - from the 1st to the 4th meeting: execution of the class and development of the game”. Contents covered: Organization of game construction activities and pedagogical proposals based on the contents of the previous block. Material resources explored: Computer, Data-show, paper and office supplies.

6th meeting, “Consumption, Work and Citizenship”. Contents covered: History of Mathematics: study of probability and statistics. Reason. Proportion. Financial mathematics: ratio, proportion, percentage, cost, profit, revenue, expense. Functions: linear, quadratic and exponential. Financial education: individual and collective planning (family planning), the social function of the financial organization, awareness and planning of income and expenses. Work: work, employment, income and career

planning. Material resources explored: Technology: Calculator: pocket, scientific, financial; software (Geogebra) and spreadsheet application (Excel); videos (short films: Desirella and Ilha das Flores; feature film: Confessions of a Shopaholic; The Joneses); treatment of information: clippings of texts, figures, tables and graphs: newspapers, magazines and online text.

7th meeting, "Art and Mathematics". Contents covered: Elements of geometry (notions of point / vertex; segment / side; diagonal; axis of symmetry; angles); Sum of the internal angles of a polygon; Symmetry; elements of the parable. Material resources exploited: computer; Data-show; graph paper; folding paper; whiteboard and markers; pencils.

8th meeting, "Classical instruments of mathematics". Contents covered: Elements and Concepts of Geometry. Material resources used: rulers; protractors; compasses; pencils; erasers; graph paper.

9th meeting, "Presentation of the results of the activities developed with the course participants, in groups - referring to the 6th, 7th and 8th meetings". Contents worked on: Contents covered in the 6th, 7th and 8th meetings. Material resources used: computer, Data-show, paper and office supplies.

10th meeting, "Distribution of Teacher Rosters / individual portfolios, self-assessment and training conclusion". Contents covered: Completion of the work developed with NAEH educators, reflection on the training offered and pedagogical practices addressed in the scope of training. Material resources used: computer, Data-show.

Conclusion

The aim of the study was to present the context of Pedagogical Hospital Education Services in Goiás, with an outline of the process of training teachers working in the teaching of mathematics. When analyzing the profile of the teachers in the program, the absence of professionals in the

specific area of mathematics was revealed. Due to the challenges of the area and the teachers' demands for a mathematical training that would take the specificity of the Pedagogical Hospital Education Services into account, there arose the proposal of designing a collective training program, with the involvement and partnership of all NAEH teachers and managers.

The training program, which was based on research and intensive planning, had important variations of pedagogical strategies, material and digital resources, and environmental adaptations of accessibility, among others.

At the end of the training course, the teachers assessed that the course contributed greatly in addressing the content of the resources based on the generating themes. As they pointed out, in terms of innovation, the course presented themes, methodological strategies, material resources and evaluation processes consistent with the special reality of students, educators, available structures and other elements that are typical of the Pedagogical Hospital Education Services in Goiás.

In summary, there was a training course in the area of mathematics, aimed at Pedagogical Hospital Education Services, which sought to address problems, difficulties and specificities of that group.

Finally, based on our experiences, we present that this type of study, using the action research methodology, enables multilateral contributions, transforming spaces, environments and people, among which, the researchers themselves.

Therefore, we must thank the courageous and involved NAEH teachers, especially those who participated in the study. With them, we become more aware, prepared and better people!

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