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THE PEDAGOGICAL KNOWLEDGE OF THE CONTENT IN THE FORMATION OF THE PEDAGOGUE: REFLECTIONS OF A PRACTICE ON THE TEACHING OF GEOMETRY IN THE EARLY YEARS

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ABSTRACT

The training of teachers who work in the Early Years, for the teaching of Geometry, needs to be based on a planning that meets not only what is proposed by the documents that guide the school curricula. From this understanding, the question originated: What can be verified in the teaching planning on geometric concepts, presented by future teachers, from the perspective of Pedagogical Content Knowledge - CPK? To answer it, a cycle of studies was proposed to Pedagogy undergraduates, at which time the students presented their plans. The data obtained were analyzed according to the Discursive Textual Analysis – ATD. Thus, it was found that these students understand the importance of the teacher knowing what to teach and how to teach it. However, it is considered that the process of internalization of the CPK, for these future teachers, needs to be experienced beyond the initial training, through actions proposed in continuing education and with the reflection of their practice.

Keywords: Teaching, Early Years, Geometry Teaching.

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INTRODUCTION

The training of teachers for the teaching of Mathematics in the Early Years of Elementary School represents a field of research in which much can still be done, considering the teaching profession, always in constant transformation. Regarding the approach given to Geometry, in the training of these professionals, it is no different. Studies already carried out point to the fact that initial training, based on undergraduate courses in Pedagogy, often does not provide these future teachers with the acquisition of the necessary knowledge to fill the gaps related to the understanding of geometric concepts, still brought from their school training (Barbosa, 2017), which may lead to gaps in the proposition of teaching to be carried out, when he became a future teacher. This fact may result from the offer of few disciplines aimed at the teaching of Mathematics in these formations and, also, because these do not always clearly present what the teacher needs to learn in order to teach (Curi, 2004).

Knowing what to teach, as well as knowing methodologies and resources that contribute to the teaching and learning processes, with regard to the approach given to Geometry in the Early Years of Elementary School, is directly related to what Shulman (1987) defines as a teacher's knowledge, called by the researcher as the Pedagogical Knowledge of Content. In this context, the following question was defined as a problem: What can be verified in the teaching planning on geometric concepts, presented by future teachers, from the perspective of Pedagogical Content Knowledge - CPK? The relevance of this research is justified in the fact that the training of the teacher who works or will work in the Early Years of Elementary School, is carried out from licentiate courses in Pedagogy, representing the opportunity to train a professional who will contribute to the quality of Basic Education, effectively considering the student's learning. In the same way, it is understood that the training offered to these professionals is the responsibility of Higher Education Institutions and, therefore, research on this topic needs to be increasingly encouraged.

THE TRAINING OF THE PEDAGOGUE FOR THE TEACHING OF GEOMETRY

Formed from Pedagogy Degree courses, the pedagogue is the professional who works in the first stages of Basic Education: Early Childhood Education and Early Years. Therefore, this teacher is responsible for presenting scientific knowledge to his students, including those related to Geometry. It is considered that the training of this professional needs to enable access to the knowledge necessary to meet this purpose.

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The understanding of geometric concepts enables the development of skills such as comparing, measuring, generalizing, and abstracting. This is in line with what Zortêa (2018, p. 38) states when she argues that it is necessary to rescue the teaching of geometry in school, since its importance is justified in the "development of problem-solving skills, instigates investigative practice/perception, helps in the capacity for synthesis and analysis, in argumentation and initiative, primordial points for the formation of the critical student in the society in which we live".

Thus, for the teacher to teach geometry, he needs, in addition to understanding, to know methodologies that contribute to the understanding of these concepts. However, according to Bulos and Souza (2011, p. 2), knowing "methodologies without mastery of concepts does not guarantee success in the teaching and learning process, just as mastery of concepts without space for reflection does not guarantee either". Zortêa (2018, p. 38) considers that "for the teacher to teach Geometry, more than just the use of the textbook is necessary. It is essential for the success of the classes that the student understands the content".

Regarding the curriculum proposed in the training courses for polyvalent teachers, Curi (2004, p. 20) states that

> [...] the knowledge of the teaching object is disregarded; Not always the clarity about what are the contents that the teacher in training should learn, because he needs to know more about what he is going to teach, and about which contents will be objects and his teaching activity.

Also, according to the author (CURI, 2004), in these courses, with rare exceptions, more emphasis is placed on "knowing how to teach" the contents, to the detriment of their broadening and deepening, as a theoretical field. According to Carvalho (2017), the curriculum focused on the teaching of Mathematics, especially Geometry, in Pedagogy courses needs to be rethought, so that it enables the reconstruction/expansion of the geometric thinking of these future teachers, from moments that allow them not only to complement/expand their knowledge, but also to apply such knowledge in their teaching practice.

Also, according to Carvalho (2017, p. 48), "Knowing how to teach Geometry" is knowledge "mobilized in a learning environment that leads someone (licensing) to learn for themselves and to learn to teach, without disregarding the context involved and its

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characteristics, that is, a knowledge that takes into account the "sociocultural scenarios". In addition

> [...] to deal with the Geometry that is developed in the school and expand it in order to bring elements that allow the teacher (future teacher) to understand enough to be able to communicate in detail, knowing the backstage, asking questions, but within a certain dynamic, within a certain learning environment that we seek to provide for someone (depending on the situation) (Carvalho, 2017, p. 48).

It is considered relevant, therefore, that the Teaching Degree courses provide future teachers with an adequate training for the teaching of mathematics and for the teaching of geometry, since these professionals will have the responsibility of teaching geometric concepts in the Early Years of Elementary School. From this perspective, according to Lorenzato (1995, p. 3-4), "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, everything indicates, the dilemma is to try to teach Geometry without knowing it or not to teach it".

In the same way, it is believed that planning, an action inherent to the teaching practice, requires the teacher to be clear about the objectives for which he is being proposed, that is, his intentionality. To do so, the teacher needs much more than knowing the concepts to be taught. According to Farias et al (2014, p. 111),

> Planning is an act; It is an activity that projects, organizes, systematizes the teaching practice with regard to its ends, means, form and content. Thinking about our work, we adjusted not only the syllabus to the school calendar [...], but also defined other issues of fundamental importance. Let's look at a few: what do we want our students to do, to know? Why this content, and not that one? What activities? What time and resources do we have?

In the same way, the researchers also affirm that planning represents a reflective, continuous action, because for the proposed objectives to be achieved, this process must be permeated by the evaluation and review of what we do and what we need to accomplish. Therefore, planning is a decision-making and political act, since it requires methodological and theoretical choices. These choices are based on questions such as "what to teach?" and "how to teach?", which answer them is possible when the teacher mobilizes the Pedagogical Knowledge of the Content.

Described by Shulman as the teacher's "professional knowledge", which makes him capable of transforming specific content into teachable content, and therefore represents

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the intersection between content and pedagogy, Pedagogical Content Knowledge is something intrinsic to teacher training and practice.

In this sense, according to Carvalho (2017, p. 30),

> This knowledge reflects an understanding of the way specific topics and questions are organized, represented, and adapted to be taught, according to the different interests and abilities of students. Thus, the knowledge called "Pedagogical Knowledge of Content" or "Didactic Knowledge of Content" would be a combination of knowledge of the discipline and knowledge of the "way of teaching" and of making the discipline understandable to students.

This enables the understanding that the Pedagogical Knowledge of the Content directly influences what defines the teaching practice: the planning that makes it possible to develop the action of teaching. For, according to Born et al (2019, p. 4), Shulman considers that,

> To teach, it is necessary to reflect on multiple ways in which this concept can be represented and learned, as well as what are the most productive teaching strategies and learning experiences so that all students develop an understanding of the content. In addition, it is up to the teacher to identify what the students' recurring misunderstandings are, knowing how to deal with them. Finally, the teacher needs to know how to articulate the various identities of the students and their previous knowledge with the object of knowledge itself.

In this sense, Vieira and Araújo (2016, p. 93) argue that,

> [...] the selection of the most pertinent strategies to teach each topic of the content in specific circumstances in the classroom also characterizes the pedagogical knowledge of the content, since Shulman (1986) refers, above all, to the way the teacher constructs the representations, that is, interprets the content and transforms it to facilitate understanding by the student, mobilizing him for knowledge. It is, therefore, the ability to transform the content of the subject into activities and experiences to facilitate learning, which includes analogies, the use of examples, explanations and demonstrations of that specific topic of content.

Therefore, planning influences teaching practice in a significant way, as it is from it that the teacher structures the actions he proposes for his class. It is also from this that this professional defines the objectives he intends to achieve with his students, in addition to the methodology and resources he will use.

By making these choices, based on their intentionality, the teacher transforms the concept to be taught into knowledge to be understood by their students. Which for Shulman (1986) represents a characteristic of Pedagogical Content Knowledge.

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PEDAGOGICAL KNOWLEDGE OF THE CONTENT

Contrary to what common sense says – that to be a teacher it is enough to know the contents, practice reinforces that this is not the only thing that characterizes a good teacher (Fernandez, 2011). So, what does a teacher need to have for him to perform the function of teaching scientific knowledge, one of the central functions of the school institution? Questions like this are becoming increasingly present in the academic environment.

Reflecting on knowledge/knowledge necessary for teaching practice is justified in the understanding that "No one is born an educator or marked to be an educator. We become educators, in practice and in reflection on practice" (Freire, 1991, p. 58), that is, the teacher is constituted from his experiences, from his academic training, both initial and continued.

In this sense, the same occurs with the knowledge necessary for teaching practice, called by Shulman as Pedagogical Content Knowledge, and defined by him as "the ability of a teacher to transform the knowledge of the content he has into pedagogically powerful forms adapted to the variations of the students, taking into account their experiences and baggage (Shulman, 1987, p. 13)".

The concept of CPK, an acronym for *Pedagogical Content Knowledge*, was presented by Lee Shulman at a conference at the University of Texas in 1983, entitled The Lost Paradigm in Teaching Research. Later, the researcher defined it as "the ability of a teacher to transform the knowledge of the content he has into pedagogically powerful forms" (Shulman, 1987, p. 9).

Also, according to Fernandez (2015, p. 504), the CPK, in Shulman's conception "would represent the professional knowledge of teachers, something that would distinguish a teacher of a given discipline from a specialist of that same discipline", because

> [...] what is sought is the valorization of the professional activity of teachers, elevating it to a space for transformation and construction of specific knowledge for the profession. Thus, knowledge is the specialization of knowledge, that is, knowledge passes through the reflection of know-how, raising practice to a level of awareness, reflection, analysis, systematization and intention.

In this way, the term teacher's knowledge gives way to the concept of teacher's knowledge, since "knowledge is the product of social practices, knowledge is the organization of this product of social practices in a systematic, rational way, in scientific activity" (Fernandez, 2015, p. 503 *apud* Geraldi, 2003, p. 18), and "knowledge would be closer to the scientific production systematized and historically accumulated with stricter

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rules of validation traditionally accepted by the academy (Fiorentini; Souza Júnior; Melo, 1998, p. 312).

For Shulman, the knowledge of the specific content and the pedagogical knowledge represent the knowledge acquired in the initial training of the teacher, produced since graduation, at the university. The understanding of pedagogical competence, on the other hand, is linked to a specific content that is transformed, taking into account the students' difficulties with this content, the context, the instructional strategies, the modes of evaluation, the curriculum, the objectives, etc. (Fernandez, 2015, p. 504).

Valued by Shulman, the specific knowledge of the content, the one that defines the field of training and action of the teacher, which the teacher needs to "pedagogize", that is, make his students able to understand it, is what guarantees his professionalization. For this, according to the author, the teacher needs to have mastery of the specific content, and this mastery occurs at three levels: "knowledge of the content itself, curricular knowledge of the content and pedagogical knowledge of the content"' (Fernandez, 2015, p. 505).

In addition to these three levels, according to Lara (2019, p. 41-42), Shulman establishes, as a knowledge base for teaching a teacher, seven other types of knowledge:

> Knowledge of the content – refers to the specific discipline to be taught [...];
> Pedagogical knowledge (general didactic) – refers to the general principles and strategies to be organized in the classroom [...];
> Knowledge of the curriculum – refers to the mastery of curricular standards, materials and programs, serving as "tools for the craft" of the teacher, according to the different school levels. [...];
> Pedagogical knowledge of the content – refers to the combination and union of the specific content and the teacher's didactics [...];
> Knowledge of the cognitive characteristics of the students - refers to the knowledge of various specific learning of the student, [...];
> Knowledge of educational contexts – refers to the culture of the school community, management and financing of educational systems;
> Knowledge of educational objectives – refers to the purposes and values of education, as well as its social, philosophical and historical foundations.

Knowing the content to be taught, therefore, is important, but not sufficient for teaching practice; the teacher needs to know what to teach, to whom to teach and how to teach it, which, according to Shulman (1986), are understandings related to the Pedagogical Knowledge of the Content.

For Zortêa (2018), there are two types of pedagogical knowledge: general pedagogical knowledge, referring to the fundamentals of the discipline and necessary for the teacher to work on any subject, and pedagogical content knowledge, directed to teaching, which involves knowledge of content and pedagogy.

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Also, according to the researcher, the teacher needs to know what he teaches, to have an understanding of conceptual, pedagogical and curricular aspects of the area he teaches. "And for learning to be effective, there needs to be interaction and understanding on the part of both students and teachers" (Zortêa, 2018, p. 45). This is also proposed by Shulman (1986, p. 9), when he states that,

> Teachers must not only be able to define for students the accepted truths in a domain. They must also be able to explain why a particular proposition is considered justified, why it is worth knowing, and how it relates to other propositions [...]

According to Soares (2016, p. 46), Pedagogical Content Knowledge "refers to the knowledge of the content, but in a particular way, with illustrations, examples, explanations, forms of representation, that is, aspects that favor the teaching of the content", and "includes learning facilities, allowing the teacher to undo negative perceptions or prejudices brought by the student in his baggage of knowledge in relation to a certain subject".

Therefore, the Pedagogical Knowledge of the Content is understood as being a teacher's knowledge, which differentiates him from other professionals, who, by understanding the concept to be taught, also knows who to teach and how to teach.

METHODOLOGICAL PROCEDURES

The data, as well as the analyses presented here, represent an excerpt from a research[3] doctoral degree. It is the reflection elaborated from a planning proposed by two undergraduates, members of a cycle of studies, of a Teaching Degree course. In order to maintain anonymity, the Lic Y and Lic Δ will be identified by Lic Y and Lic . Such planning results from activities developed in the study cycle, organized in seven meetings, held virtually from Google Meet. This occasion in which the teaching of Geometry in the Early Years of Elementary School, the role of official documents - BNCC and RCG - and the importance of planning for teaching practice were central topics of discussion.

It should be noted that the plans were prepared individually by each of the Undergraduates, who were asked to propose a possibility of approaching the geometric concepts indicated for this level of education. This made it possible to identify, in addition to the relationship between the skills indicated by the documents that guide the school

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curriculum today, also the methodologies and resources designed by these future teachers for this purpose.

As for the analysis methodology, it was decided to use Discursive Textual Analysis (DTA), which, according to Moraes and Galiazzi (2006), consists of an approach to data analysis that transits between two forms consecrated in qualitative research – content analysis and discourse analysis.

Based on this methodology, considering the transcription of the meeting and the record of what was planned by the undergraduates, as instruments of data production, recurrent elements observed from the speeches at the meeting and the proposed planning were defined as units of analysis. The "Planning" category was defined based on the relationship between the research problem and the theoretical field studied. The propositions, on the other hand, were the result of the researcher's understandings regarding the units of analysis and the theoretical discussion. That is, what was understood as partial answers to the problem to be answered in this study. It is summarized in the table below:

Table 1: Units of analysis, categories and propositions

Unit of analysis	Category	Propositions
Planning as the main action of the teacher	Planning	To prepare his planning, the teacher needs to know what to teach and to whom to teach it.
		To define how to implement their planning, the teacher needs to know resources and methodologies that contribute to the teaching and learning processes of the concept to be taught.

Source: Survey data, 2021.

Based on these understandings, the discussion of the data produced is presented below, based on the references that theoretically support it.

RESULTS AND DISCUSSIONS

In this item, it was analyzed how the licentiate students mobilize elements related to the Pedagogical Knowledge of the Content when preparing a plan aimed at the teaching of Geometry in the Early Years of Elementary School. That is, how these future teachers organize themselves in the face of the need to know what to teach, how to teach and to whom to teach.

After being discussed, problematized and presented plans and official documents, which guide the work of the teacher in the initial years, it was focused on which elements

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should be considered by the licentiate students in their planning proposals. For this, official documents - BNCC and RCG - and articles on the teaching of Geometry in the Early Years of Elementary School were organized for the Undergraduates in the Classroom. These materials were considered for discussion in previous meetings, during the study cycle.

Initially, the Licentiate Students should define the class for which the planning would be organized, what the official documents bring to be worked on in this class, what are the competencies, skills, concepts, to be worked on and the effective propositions for planning. It is reinforced that the need to resume the discussion listed in the official documents was made effective by the understanding that they represent a guideline for the definition of school curricula.

Based on the proposal for organizing the planning, the Licentiate Students selected the skills presented in the table below, organized from the class for which the planning would be organized.

Chart 2: Starting Planning

Licensing	Year	Skills proposed in Official documents
Lic Y	4th Grade	(EF04MA17). Associate prisms and pyramids to their plans and analyze, name and compare their attributes, establishing relationships between plane and spatial representations.
Lic Δ	3rd Year	(EF03MA15) Recognition of plane figures and some properties (circle, square, rectangle, triangle; trapezoid; parallelogram; sides, vertices; axes of symmetry and congruence). (EF03MA15RS-2) Handle, discuss and measure plane figures, using rulers, tape measures, strings and other conventional or non-conventional measuring instruments, noticing the similarities and differences between them.

Source: Survey data (2021)

From the table presented, it can be seen that the licentiate students were able to relate the skills proposed by the official documents, in the Geometry thematic unit, to the class to which the elaborated planning is destined. It is believed that this fact is due to the study of these materials, proposed at various times of the proposed study cycle. It is reinforced that the curricular reforms, which resulted in documents with the BNCC and the RCG, need to be widely discussed in undergraduate courses, because according to Nacarato, Mengali and Passos (2019) not problematizing such documents can result in the training of teachers who reproduce the models they experienced as a student.

Also according to the researchers, not discussing such reforms in teacher training results in a "class culture based on a more or less homogeneous routine in the way

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mathematics is taught, but also in a curriculum, practiced in the classroom, quite distant from contemporary discussions in the field of mathematics education (Nacarato, Mengali E Passos, 2019, p. 29)."

In the same way, it is understood that discussing these documents in the training of teachers of the Early Years of Elementary School allows a better understanding of what to teach Mathematics at this level of education. In this sense, Born et al (2019, p. 4) state that,

> [...] It is necessary for teachers to have an academic background in the area of teaching to understand the structures of the discipline, its concepts and principles, as well as to understand the important ideas and skills of the field. Such knowledge is crucial, because with a broad and deep view of the area, the teacher is able to identify the different ways of accessing knowledge - a fundamental factor for the construction of learning.

However, in addition to knowing the curriculum that describes the concepts to which he should teach, the teacher needs to understand that "[...] the same content becomes different, from a cognitive point of view, from the moment it is thought of as something to be taught" (BORN et al, 2019, p. 11). Therefore, it is up to the teacher to define how he will conduct the teaching process, based on strategies that will transform the content of the subject into experiences that contribute to his learning, this professional needs to know methodologies and resources that also meet this purpose.

As for the procedures to be carried out to teach, the undergraduates proposed very diversified methodologies.

Table 3: Proposed activities

Licensing	Activity 1	Activity 2	Activity 3
Lic Y	Conversation circle about some geometric solids	Construction of some geometric solids, from their flats	Geometric solids in our daily lives
Lic Δ	Reading of the book "Once upon a time, a chess cat".	Construction of the Tangran	Working with packaging.

Source: Survey data (2021)

In attention to the EF04MA17 skill, indicated by the BNCC for the fourth year of Elementary School, the licentiate student identified by Lic Y, for example, proposed a conversation circle, using some solids such as cubes, pyramids, prisms, cylinders and spheres. Later, the teacher "will ask the children if they already knew about these objects. It is necessary to listen to their positions, because the baggage brought from home, from the street and from school is of great importance, because only then will the teacher know her

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starting point in class" (Lic Y, Planning). In this sense, Vieira and Araújo (2016, p. 92) state that "The understanding of how students can interpret the specific topics of the content, based on their previous knowledge, identifying possible mistakes and difficulties, also makes up the Pedagogical Knowledge of the Content [...]".

As a second activity, this student proposed the construction of some geometric solids, based on plans made available by the teacher. Followed by a discussion about what objects they would have at home that resemble the built solids. To this end, he indicated some questions that could be asked:

> What is a Geometric Solid? The hat worn at birthday parties, is it similar to which Geometric solid? Give an example of an object that looks like a Cobblestone? Which object reminds you of a cube? Name 3 objects that you have in your house and that remind you of geometric solids. (Lic Y, Planning)

According to Lic Y (Planning) these questions "are important to make students think about the contents already worked on. It is important to make them think and relate the contents to their daily lives, because when they look at such an object they will remember the concepts studied".

Recognizing processes and methodologies that enhance the learning of its students represents an important characteristic of Pedagogical Content Knowledge, since it

> [...] It consists, therefore, of the ways of formulating and presenting the content in a way that is understandable to the students, including the use of analogies, illustrations, examples, explanations and demonstrations. In addition, the PCK also concerns the teacher's understanding of what facilitates or hinders the learning of a specific content, in addition to the students' misconceptions and their implications for learning (Almeida et al, 2019, p. 5)

Therefore, it is possible to defend the record as an element of explanation of how the teacher understands what he is teaching and the reflection of its understanding in the way students learn. This is in line with what Curi (2004, p. 30) proposes when he states that "The teacher's knowledge is also characterized by its difference in relation to the knowledge of a specialist in the discipline and has a strong component of knowing the discipline to teach it".

As for the third activity, Lic Y indicates as a proposal that allows "to lead the student to revisit the concepts studied" (Planning, 2021) that the teacher brings printed on a sheet of paper pictures of some objects present in our daily lives. And through comparison with the solids produced during the previous activity, each student should identify which

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geometric figure best represents such objects. This would allow the development of "skills and competencies necessary for solving problems in our daily lives" (Bulos; Souza, 2011, p. 5).

As an approach to the study of plane figures, for the 3rd year of Elementary School, based on EF03MA15 (BNCC) and EF03MA15RS-2 (RCG) skills, Lic Δ suggests the text "Once upon a time, a chess cat" by Bia Villela. After the collective reading by the class, the teacher will ask the students "What were the colors of the cats? How many geometric shapes does it take to form a cat? Name the geometric shapes used in the construction of the Xadrez cat." (Lic Δ, Planning, 2021)

In this sense, Nacarato, Mengali and Passos (2019) state that proposing activities involving children's literature texts contributes to students understanding the mathematical language contained in them, as they enable the development of literature skills from literary texts and with specific mathematical language in a meaningful way.

Also according to the researchers,

> It is important to propose this type of activity, so that, as far as possible, students find, in the diversity of the texts presented, a relationship between reading and mathematical content, which is still a "problem-situation". With this, mathematical ideas and comprehension of texts should be explored at the same time. In view of this action, skills can be developed concomitantly, while students read, write, and discuss, because at that moment the ideas and concepts addressed by them will be linguistic and mathematical (Nacarato, Mengali, and Passos, 2019, p. 90).

The researchers affirm that in addition to enabling students to relate mathematical content, there are several types of texts, this methodology allows them to explore events and places, identify with the characters and try to solve the challenges they propose. However, if these students can not only read the stories, but discuss them and the mathematical ideas presented in them, such activities will contribute significantly to the development of mathematical and language skills simultaneously.

Continuing the activities, now with the help of Tangram, Lic Δ suggests some questions to the students, considering the format of each of the pieces, identifying differences and similarities between them. To this end, he poses questions such as: "What types of figures is the Tangram composed of? Which of the figures are the same? Why are they the same? Why are they different?" (Lic Δ, Planning, 2021)

By exploring the geometric aspects that describe the pieces that make up the Tangran, it is possible to identify in this planning a proposal for the use of games for the teaching of Geometry. In this regard, Silva (2017, p. 58) argues that when proposing this

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resource, the teacher must know the material "to explore it properly. Doing a study of this pedagogical instrument is essential and important to outline pedagogical actions that can strengthen and consolidate relevant mathematical concepts for students".

As a third activity, Lic Δ proposes that the teacher work with packaging brought by the students. These materials will be cut in order to obtain their flattenings. Later, the children will be asked to draw the figure obtained in this process and identify the flat figures that make up the faces of the chosen box.

In this sense, Müller and Lorenzato (2015, p. 3) state that when selecting the material that will be used in their class, the teacher needs [...] to be aware of the resources that he must make available to the children, so that they favor the construction of their ideas. In addition to manipulable materials, the elaboration of problem-situations can be fundamental for the development of the concepts under study.

As for the didactic resources suggested in the planning, in addition to games, concrete materials, geometric solids and their planning were identified. It was noticed that the use of these resources was proposed mainly accompanied by reflections on the concept to be taught, in addition to its relationship with the physical world, with real situations. This is in line with what is proposed by Bulos and Souza (2011, p. 4) when he indicates that "the teacher must consider the knowledge, experiences, needs and interest of students when deciding the path to be taken in the teaching of geometry".

According to Müller and Lorenzato (2015, p. 4),

> [...] The child first lives with physical beings through the size, contour, surface of the objects that surround him; Then, with the need to measure them, the so-called geometric entities such as perimeter and area arise, which are expressed in numbers, which are the arithmetic entities. In this way, one starts from the real, lived and felt world, to the world of forms and measures [...] of abstraction.

From the plans proposed by the participants of this study, it is possible to identify indications that they mobilize the Pedagogical Knowledge of the Content, even if in a very simple way, when they recognize what to teach, how to teach and to whom to teach. However, because these are plans that were not implemented, it was not possible to identify how these licentiate students performed the function of managing the classroom.

It should be noted that these plans were presented to the group of participants during the seventh meeting proposed by the study cycle. And that at this moment there was a discussion about knowing how to teach, knowing teaching methodologies and how students learn. In addition to the importance of the evaluation moment, as it represents an

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opportunity for the teacher to review what was planned and what was actually implemented. This would enable him to identify possible changes necessary to continue the search for achieving the established objective.

Analyzing these plans allowed us to understand that the Pedagogical Knowledge of Content is what "allows transforming scientific content into school content and so that it can thus be taught" (Vieira and Araújo, 2016, p. 90). And that this knowledge "is dynamic knowledge, in the sense that he uses different types of knowledge in the context of his profession and that he constructs and uses it according to his own reasoning" (Curi, 2004, p. 28).

In view of this, it is recognized that teacher training, including that carried out from the teaching degree course in Pedagogy, needs to "operate with conceptions and premises that guide the actions of the future teacher, who needs to take ownership of using his knowledge base in his choices and actions" (Almeida et al, 2019, p. 5).

FINAL CONSIDERATIONS

The training of the Pedagogue, as a teacher who teaches Mathematics, becomes even more necessary nowadays, as this professional is responsible for presenting such concepts to students in the Early Years of Elementary School. In other words, such a theme represents a field in which there is much to be studied, to be researched. From this understanding, it was considered necessary to answer the following question: What can be verified in the teaching planning on geometric concepts, presented by future teachers, from the perspective of Pedagogical Content Knowledge - CPK? In order to answer this question, the reading of texts about the training of the pedagogue for the teaching of Geometry began, with which it was possible to verify that future teachers bring gaps in the understanding of the concepts they will need to teach and that often the teaching courses cannot remedy. This fact was also verified from the cycle of studies carried out.

As for the readings referring to the Pedagogical Knowledge of the Content, according to Shulman (1986), it was possible to recognize this as a professional knowledge of the teacher, which differentiates him from other professionals and enables him to transform the concept to be taught into something that can be apprehended.

From the analysis of the plans presented here, it was possible to reinforce the understanding that in order to prepare their planning, the teacher needs to know what to teach and to whom to teach it. In the same way, to define how to carry out their planning,

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this professional needs to know resources and methodologies that contribute to the teaching and learning processes of the concept to be taught.

However, even recognizing that these licentiate students demonstrated that they know what to teach, to whom to teach and how to teach, which is understood as being indications of the mobilization of Pedagogical Content Knowledge, it is considered that this process is still in the initial phase of development and that it needs to be stimulated beyond the Pedagogy course, through actions aimed at their continuing education.

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