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TASKS ADDRESSING SURE OR CERTAIN RANDOM EVENTS IN A PEDAGOGICAL GAME IN ELEMENTARY SCHOOL

TAREFAS ABORDANDO EVENTOS ALEATÓRIOS CERTOS OU SEGUROS EM UM JOGO PEDAGÓGICO NO ENSINO FUNDAMENTAL

TAREAS ABORDANDO SUCESOS ALEATORIOS JUSTOS O SEGUROS EN UN JUEGO PEDAGÓGICO EN EDUCACIÓN PRIMARIA

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Abstract: This study is a theoretical work, based on the principles of the Anthropological Theory of the Didactic (ATD), in its didactic and probabilistic praxeological organization. ATD is used to create statistical tasks that expose and explore, in detail, the practice and probabilistic theory involved in the question cards of the game "Playing with Probability" focused on certain or sure random events. It is presented as an option for working with the initial years of elementary school in Brazil (students aged 6 to 8), starting with problem situations that were elaborated from the skills proposed by the National Common Curricular Base (BNCC), i.e. with identification, in random everyday events, highlighting those considered certain or sure. Finally, the possibility is considered of carrying some experiments in the classroom that are proposed on the game cards, creating an opportunity for intervention in favor of the construction of the notions of probabilistic concepts.

Keywords: Sure or Certain Random Events. Elementary School. Pedagogical Game. Anthropological Theory of Didactics.

Resumo: Este estudo compreende um trabalho teórico, partindo dos princípios da Teoria Antropológica do Didático (TAD), na sua organização praxeológica didática e probabilística, utilizada para a criação de tarefas estatísticas que expõem e exploram, de forma detalhada, a prática e a teoria probabilística envolvida nas cartas pergunta do jogo "Brincando com a Probabilidade", focadas em eventos aleatórios certos ou seguros. Apresenta-se como uma possibilidade de trabalho para os anos iniciais do ensino fundamental no Brasil (alunos de seis a oito anos), partindo de situações-problema, que foram elaboradas a partir das habilidades propostas pela Base Nacional Comum Curricular (BNCC), qual seja, parte-se da identificação, em eventos cotidianos aleatórios, destacando os considerados certos ou seguros. Considera-se, por fim, a possibilidade de realizar, em sala de aula, alguns experimentos que são propostos nas cartas do jogo, promovendo oportunidade de intervenção em prol da construção das noções dos conceitos probabilísticos.

Palavras-chave: Eventos Aleatórios Certos ou Seguros. Ensino Fundamental. Jogo Pedagógico. Teoria Antropológica do Didático.

Resumen: Este estudio es un trabajo teórico, basado en los principios de la Teoría Antropológica de lo Didáctico (TAD), en su organización praxeológica didáctica y probabilística, utilizado para crear tareas estadísticas que exponen y exploran, en detalle, la práctica y la teoría involucradas en la pregunta. Cartas del juego "Jugando con Probabilidad" enfocadas en eventos aleatorios ciertos o seguros. Se presenta como una posibilidad de trabajo para los primeros años de la educación básica en Brasil (estudiantes de 6 a 8 años), a partir de situaciones problemáticas que fueron desarrolladas a partir de las competencias propuestas por la Base Curricular Común Nacional (BNCC), es decir, parte de ella. Implica identificar eventos cotidianos aleatorios, destacando aquellos que se consideran ciertos o seguros. Finalmente, se considera la posibilidad de realizar en el aula algunos experimentos que se proponen en las tarjetas del juego, promoviendo una oportunidad de intervención a favor de la construcción de nociones de conceptos probabilísticos.

Palabras clave: Eventos Aleatorios Ciertos o Seguros. Enseñanza Fundamental. Juego Pedagógico. Teoría Antropológica de lo Didáctico.

INTRODUCTION

Initially, we take the premise that probability is all around us, and that it is very useful and important to learn this principle from an early age. Our opinion is that students in the first years of elementary school are able to understand experiments with notions such as possible, impossible and certain, and also more precise notions, such as unlikely, probable and very probable. We believe that these experiences are necessary for their later education, especially for probability content and problem-solving skills.

Andrew (2009) stresses the importance of concrete experience, as he believes that students are better able understand probability content if they have previously carried out experiments related to probability. Conducting probabilistic experiments encourages students to develop understandings of probability based on actual events rather than merely calculating answers based on formulas.

HodnikČadež and Škrbec (2011) also state that students who have acquired concrete experience in probability develop their understanding on this basis and seek to define the starting points to calculate the probability of certain events.

Threlfall (2004) believes that probability content should not be explored until children are able to go beyond simple situations and deal with more complex ones. He expresses doubts about whether experiments prove children's understanding and mathematical reasoning. The author concludes that children should learn probability in the final years of elementary school, while in the early years, they should receive probabilistic tasks that are capable of deducing the complexity of simple situations in relation to probability.

For HodnikČadež and Škrbec (2011), probability content can be introduced into the context of mathematical literacy from the early school period, with emphasis on the active participation of the child in discussions about possible, impossible, certain or even equally probable situations.

In addition, for Fischbein (1985), probability concepts and techniques need to be integrated into mathematics classes from primary level, and not just in the upper grades or even in high school, when the human mentality is already developed.

We also highlight, according to Batanero (2013), that in the early years of elementary school, formal contact with probability is necessary, developing an intuitive basis of probabilistic concepts. The way in which children can acquire these bases should be introduced through activities based on direct contact with improbable situations.

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Thus, our research problem was to show the possibility of developing a pedagogical work for the initial years of Elementary School, based on games and problem solving, creating methodological theoretical support to enable the students to rethink strategic methods, redimensioning them in order to minimize the gap that exists between the daily recreational activities carried out by spontaneously by students and the tasks set for them in the classroom.

Based on the research theme and the research problem, this work aimed to elaborate problem situations (or tasks, according to the Anthropological Theory of Didactics - ATD) involving the classification of certain or sure random events for the game "Playing with Probability" as a means of teaching probability in the early years of elementary school (students aged 6 to 10 years), following the principles of ATD by Chevallard (1996) and Chevallard, Bosch and Gascón (2001), in the praxeological organization of didactics and mathematics (probability).

THEORETICAL FRAMEWORKS

Based on the way Probability emerged, many authors defend the idea that play is the best way for children to learn probabilistic concepts. Góngora (2011) proposes that to work on Probability, games of chance should be used with both playful and pedagogical approaches, giving students their initial contact with the field of Probability, in a fun way.

Alsina (2011) reminds us that encouraging discovery through manipulative experience, rich in material resources, encourages meaningful learning, increases learner motivation, improves understanding, and is more attractive to students than a purely theoretical class.

Batanero (2000) states that as in any branch of mathematics, manipulating material must play a key role in the early stages of education, as children need concrete references for the abstract concepts that we are trying to teach.

In this work, the game created to teach principles of probability can be considered as a concrete reference, as stimulates a variety of cases that can favor the formulation and organization of ideas generated from the dynamics of the game itself, i.e. the communication and arguments of the players themselves, as they deal with problem situations.

Vásquez and Alsina (2014) propose, for the study of probability, the use of concrete materials such as chips, dice and games of chance, as these will be of great help in conducting random experiments that will reinforce the concepts taught.

Torra (2016) gives several examples of activities aimed at elementary school children that use manipulative material, and it can be clearly seen how experimentation and action favor the construction of knowledge. The same author states that when exploring objects or situations, children are forced to investigate; they need to ponder, reason, think of a solution, look for different perspectives, compare with their partner and with other groups, and with what they did before, and express themselves. Even if they are reluctant to take part, or have doubts and questions, they will want to satisfy their curiosity, and to help their partner, which will prompt them to want to learn and to feel a sense of achievement when they find the solution.

Alsina (2011) explains how games help the child to escape reality, to resolve conflicts in a symbolic way and thus create a series of mental processes that will help them internalize mathemat-

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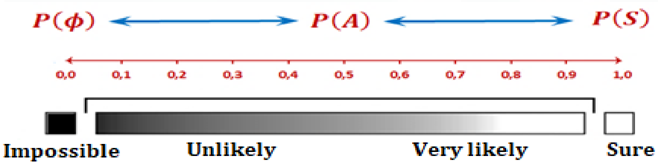
ical knowledge, but in a fun, playful way, with the added element of socialization. Play motivates, excites and helps the student to overcome the fear of failure when faced with problems or tasks.

According to MOOC (2020), random events are considered subsets of a sample space, and an event is considered a possible result of an experiment. We can consider that the probability of the sure or certain event (which represents the entire sample space = S) is one or P(S) = 1, considering that for any event A it is true that: $0 \leq P\ (A) \leq 1$, considering the scheme (Figure 1) at P(S) = 1 and associated with certain or sure events. This event will always happen. It is composed of all the elements of the sample space that we call S, that is, it covers all possible results of a random experiment, being the opposite of the impossible event – P (∅).

Figure 1 - Scheme indicating random events.



Source: Translated from MOOC (2020, p. 81).

According to Meyer (2000), an event A (relative to a particular sample space S, associated with a random experiment) is simply a set of possible outcomes. In the terminology of sets, an event is a subset of a sample space S. Considering our previous exposition, this means that S itself constitutes an event that is certain or sure.

In Finland, students encounter topics on data processing in the first and second grades of school, while topics related to probability are taught for the first time in the third grade. After learning data processing, statistics and probability from the third up to fifth grade, pupils are expected know how to clarify the number of different events and alternatives and to judge which event is impossible and which is certain (FINISH NATIONAL BOARD OF EDUCATION, 2014).

According to the BNCC (BRASIL, 2018), the study of probability in the early years of Elementary School aims to promote the understanding that not all events are deterministic. Therefore, initial work with probability should focus on developing the notion of randomness, so that students understand that there are events that are certain, impossible, and possible. In addition, the BNCC warns that:

> It is very common for people to judge as impossible events that they have never seen happen. At this stage, it is important for students to verbalize, in events involving chance, the results that could have happened as opposed to what actually happened, initiating the construction of the sample space (BRASIL, 2018, p. 230, our translation).

In the case of this work, gradually, among the possible random events, random situations or experiments are started that work with the idea of randomness in everyday situations, in this case, those things that we call certain or sure. Thus, the probabilistic contents that are associated with this

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study, according to the BNCC (BRASIL, 2018), for the early years of Elementary School (1st year to 3rd year), students aged 6 to 8 years, are presented in Table 1 (description of knowledge objects and their respective abilities).

Table 1 – Objects and Skills of the probabilistic contents proposed in the BNCC from the 1st to the 3rd year of Elementary School.

	1st Year	2nd Year	3rd Year
OBJECTS	Notion of chance.	Analysis of the idea of randomness in everyday situations.	Analysis of the idea of chance in everyday situations: sample space.
SKILLS	(EF01MA20) Classify events involving chance, such as "it will happen for sure", "maybe it will happen" and "it is impossible that it will happen", in everyday situations.	(EF02MA21) Classify results of random everyday events as "very unlikely", "very likely", "unlikely" and "impossible".	(EF03MA25) Identify, in random family events, all possible outcomes, estimating those with greater or lesser chances of occurrence.

Source: Brasil (2018, p. 280-281; 284-285; 288-289).

We also highlight the terms and expressions that students associate with the word and concept of certain or sure in the study by Vásquez and Alsina (2017), which are "Highly possible" and "certainty". The authors sought to analyze the linguistic elements present in the development of problem situations, the purpose of which is for students to begin training in the formation of the language of chance and probability, so that they are later able to predict and conjecture as to the possibility of successes occurring. Considering this concept, difficulties were observed, but to a lesser extent, as some of the students used this concept to refer to situations that have several possibilities of occurring; however, almost all the students used the concept appropriately.

We understand that the pedagogical systematization for resolving problems in the context of games aimed at teaching probability, if well-structured and guided, enables the students to learn and understand probabilistic terms and the meaning of those terms, facilitating the development of basic notions on the subject.

Finally, we present studies by Oliveira Júnior (2013) and Oliveira Júnior et al. (2015, 2017, 2018) which aimed to present and apply the game "Playing with Statistics and Probability" for elementary school students, with the aim of helping the students understand the content, for teaching and learning the basic concepts of statistics and probability, using the problem-solving methodology.

After the application of the game, most students declared that they had enjoyed the activity and had learned from it, and it can be seen that it served as a methodological support for Statistics and Probability.

From this perspective, this research sought to propose problem situations that favor the understanding of the abstract nature of predictability and uncertainty, covering concepts of randomness, independence and variation.

All the situations proposed in the game carry their own and diverse language, as the students need to become familiar with probabilistic terms, and to develop the ability to use and talk about these terms.

Among the proposed questions, most involve events that require verbal communication, while a few involve events that can be represented by quantitative systems, providing students with contact with different forms of probabilistic statements.

In addition, the problem situations proposed in the game are drawn from the student's daily life and can be contextualized with the present time, which favors meaningful learning.

Faced with situations that permeate everyday life, we believe the student's critical sense flourishes and develops, as it ends up making choices, opinions, arguments, validation of thoughts and decision-making inevitable.

METODOLOGY

This study is a theoretical work that brings "a didactic and mathematical praxeology that exposes and explores, in detail, the practice and mathematical theory (probability) involved in the cards of the game "Playing with Probability" focused on certain or secure random events, which we associate with the resolution of tasks or problem situations.

Thus, in this work, we call tasks the various problem situations that will compose the "questions" cards of the game, based on the methodology of problem solving and focusing on certain or sure random events. According to Van de Walle (2009) the game may not look like a problem, but it may be based on a problem. By enabling students to reflect on ideas that they have not yet formulated fully, the game fits the definition of a task based on problem solving.

We reinforce that the notion attributed to the task also reflects the anthropological sense of the theory, including only actions that are human, not coming from nature (CHEVALLARD, 1999). It is also highlighted that the ATD is focused on study activities, and does constitute a theory of teaching or learning.

Bosch and Chevallard (1999) restrict the notion of task in mathematics by distinguishing mathematical activity from other human activities, that is, when faced with a task, one must know how to solve it. The "how to solve the task" is the engine that generates a praxeology, that is, it is necessary to have (or build) a technique, which must be justified by a technology. And the technology, in turn, needs to be justified by a theory. The word technique will be used as a structured and methodical process, sometimes algorithmic, which is a very particular type of technique.

To achieve these objectives, this research was guided mainly by the BNCC (BRASIL, 2018), which brings content and probabilistic skills to be worked on in the early years of Elementary School, and by the Anthropological Theory of Didactics - ATD, which allows for a praxeological mathematical and didactic analysis of these tasks.

This praxeological notion, in the words of Chevallard, Bosch and Gascón (2001), can be described, in its simplest form, as a mathematical or other activity in which there are two blocks that complement each other: on the one hand are the tasks and techniques, and on the other, technologies and theories.

According to Chevallard (1996), a praxeology related to the task T needs (in principle) a way of performing, that is, a way of executing a given task. In the block of knowledge (logos), the first component is a rational discourse, called technology (θ) and theory (Θ) which represents a higher level of justification, explanation and production that plays the same role in relation to technology (θ) as it has played in relation to the technique (τ).

By uniting praxis and logos components, praxeology is obtained - generally represented by the notation [T, τ, θ, Θ]. Praxeologies are also called organizations. For example, a mathematical praxeology - which is the modeling of a mathematical activity according to TAD, is also known as mathematical organization (OM) (CHEVALLARD; BOSCH; GÁSCON, 2001). This denomination is also adopted in this work, due to the dissemination of its use (CHEVALLARD, 1999; GASCÓN, 2003; CHEVALLARD; BOSCH; GÁSCON, 2001).

The tenuous border between praxis and logos seems to result from this interdependence and the difference, at some point, may be of a merely functional nature. With that, we emphasize the integrative character between praxis and logos in school mathematics, configuring it as an articulated and integrated action of tasks for the achievement of others.

Under this hypothesis, in the development of the process of studying a mathematical object, we can see a task as an integrated articulation of other tasks and thus infer the existence of primary tasks, or more inclusive tasks in relation to the others, which we call fundamental tasks.

Thinking about this praxeology, the problem situations that make up the game cards are composed of tasks, consisting of a sequence of subtasks that can be performed using various techniques, justified by technology, which uses theories related to probability as an object of study. As a theoretical basis, the ATD was used to detail the elaboration of problem situations, which we shall call tasks, identified by (T), consisting of a sequence of subtasks (t), which can be performed using various techniques (τ) justified by technology (θ) which uses the theory (Θ) of Probability as an object of study.

The tasks or problem situations were elaborated according to the following steps: (1) Present at least one technique to solve the requested tasks; (2) Establish for the described techniques, at least, an outline of a technological discourse; (3) Articulate different types of tasks around probabilistic concepts; (4) Articulate different types of tasks using problem solving methodology.

The ATD was used in the preparation of the tasks that make up the game cards due to its mathematical praxeological organization (probabilistic) that allows us to detail the tasks in an organized way, emphasizing both the practical and theoretical aspects so that they complement one another.

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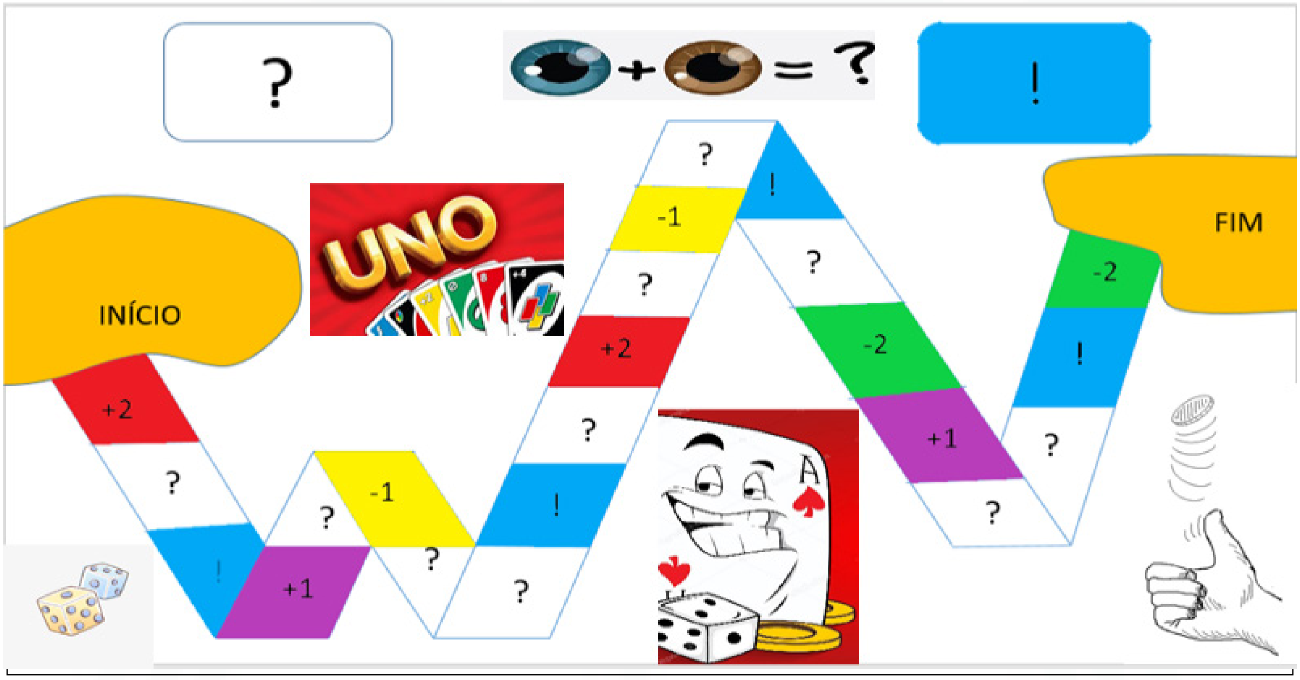
RESULTS

The cards for the game "Playing with Probability" presented here were created based on the objectives (notion of chance, analysis of the idea of randomness in everyday situations, as well as the sample space) and skills (classifying events involving chance and results of random everyday events such as "maybe it will happen" and identifying, in random family events, all possible outcomes) of the BNCC curricular proposal for the initial years of Elementary School, Brazil (2018), to enable students to understand basic concepts of probability.

Involving probability in the playful environment of a board game, we intend to provide a feeling that differs from that of a formal learning situation. The game consists of a route on a board, in which key characters move around the board at the throw of a dice. It also includes cards, which we call "Questions" (problem situations).

The board designed for the game is presented below (Figure 2), in a course format, aimed at bringing playful elements during the game.

Figure 2 – Gameboard "Playing with Probability" for the early years of Elementary School.



Source: Prepared by the authors.

Key characters in the history of Probability and Statistics, such as Karl Pearson and Ronald Fisher, were made in biscuit to represent each of the groups (Figure 3). The characters moved around the game board.

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Figure 3 – Pictures of Karl Pearson and Ronald Fisher and their biscuit versions for the representation of each of the groups in the game.

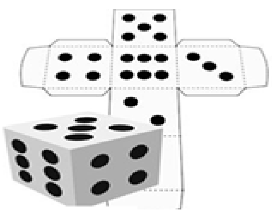
Source: Prepared by the authors.

We recall, based on Benitez (2007), that we owe to Karl Pearson the classic concepts of mathematical statistics, such as regression and correlation and distributions other than normal (preferably applied at the time), including exponential ones, suitable for the probabilistic approach of random intervals. He redefined statistics itself, as an abstract science in its own right, related to all sciences beyond the social and actuarial studies to which it was restricted.

For Rosário (2009), Ronald Aylmer Fisher was the greatest statistician of the Twentieth century. He developed several theories that revolutionized statistics and genetics. His brilliant ability to unite these two major areas still gives him a prominent place among scientists today. Unfortunately, many are unaware of his life story and his work, although they use it in their day-to-day practice, in the analysis of their research. It would be practically impossible to perform science without the ideas he developed about maximum likelihood, small sample theory, neo-Darwinism, selection theory, etc.

To move around the board, using the key characters made of biscuit, a common die is used (Figure 4). Games that use dice (or similar objects) have existed since Ancient Egypt and was part of the history of Probability long before this area was consolidated within Mathematics.

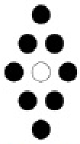
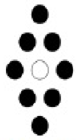
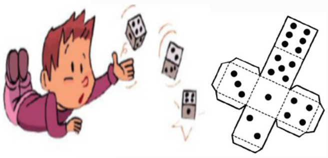
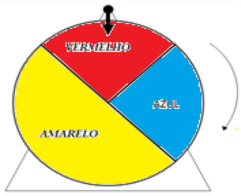
Figure 4 – Representation of common dice used to play the game.



The game cards involving probabilistic content of the Questions type (?) refer to the proposed tasks that consider events as certain or sure (E = S) as proposed in Figure 5.

Figure 5 presents tasks for the pedagogical game, which were elaborated involving certain or sure random events, following the ATD principles. Task T1 consists of determining, from the proposed tasks, when an event should be considered certain or sure. The subtasks t_1 to t_6 contained in Figure 5 propose that the student determines which of the presented options is configured as a sure or certain event.

Figure 5 –Task 1: Determine the event sure or certain.

1. The balls below are in an opaque box. When drawing one of the nine balls, which result is certain or sure?	**2. The balls below are in an opaque box. If two of the nine balls are drawn at the same time, which of the following outcomes is certain or sure?**
	
( ) Draw a red ball.	( ) Draw two black balls.
( ) Draw a white ball or a black ball.	( ) Draw two balls of the same color.
( ) Draw a gray ball.	( ) None of the alternatives.
3. João throws a dice in the air and watches to see what number it lands on. Which outcome is certain or sure?	4. By spinning the wheel below once, which outcome is certain or sure?
	
( ) It lands on number 4.	( ) It stops on yellow.
( ) It lands on a number less than 7.	( ) It stops on a primary color.
( ) It lands on number 1.	( ) None of the alternatives.
5. When picking a pen from among the five pens below, which outcome is certain or sure?	**6. When picking up one of the toys below, which outcome is certain or sure?**
	
( ) Pick a black pen.	( ) Pick a Barbie doll.
( ) Pick a blue pen.	( ) Pick a teddy bear.
( ) Pick a red pen.	( ) Pick a doll.

Source: Prepared by the authors.

To analyze the problem situations proposed in Figure 5, Table 3 presents the description of the technique referring to Task 1, according to the principles of ATD.

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Table 3 – Description of the techniques related to Task 1, that is, determining the option in which an event should be considered certain or sure.

Technique	Description
τ_1	The subtasks (t_1 to t_6) proposed in figure 5 are based on the same technique to solve them. According to the proposed situations, the student will need reflect on the problem posed in the question and based on the observation of the sample space, determine which of the listed options is certain or sure to occur. To do so, it will be necessary to reflect under what circumstances an event is considered certain or sure and, based on analyses of the conditions and context of each one, identify, among the listed options, which event will always occur.

Source: Prepared by the authors.

Still returning to the subtasks in Table 3 and detailing technique τ_1, a detailed description is given in Table 4.

Table 4 - Detailed description of technique 1 (τ_1).

Technique	Subtasks
τ_1	In the case of subtask t_1, the response to the task is the option "draw a white ball or a black ball", considering that the random experiment is: "draw a ball out of an opaque box that contains 8 black balls and one white ball" and that among the options presented, select the one that is configured as sure or sure. Remember that the sample space of this random experiment is: 8 black balls and 1 white ball. Thus, no red or gray ball is observed; it is only possible to draw black or white balls, characterizing, in the specific case of drawing a black or white ball as a sure or sure event.
	In the case of subtask t_2, the response to the task is the option "none of the alternatives", considering that the random experiment is: "draw two balls, at the same time, from an opaque box that contains 8 black balls and one white ball" and that among the options presented, select the one that is configured as sure or sure. Remember that the sample space of this random experiment is: 8 black balls and 1 white ball. Thus, it is not possible to draw two black balls with certainty, as it is possible that a black and a while ball may be drawn. It cannot be stated that it is certain to draw two balls of the same color, as there is only one white ball. Thus, among the options presented, there is no one that is configured as a certain or sure event.
	In the case of subtask t_3, the response to the task is the option "a number less than 7 is rolled", considering that the random experiment is: throw the dice upwards and observe the number that will come out. Thus, considering that the sample space of this random experiment are the following values: 1; 2; 3; 4; 5; 6; it is not certain that only the number 4 or only the number 1 will be rolled. Thus, among the options indicated in the problem, rolling a number smaller than 7 is associated with the set S = {1; 2; 3; 4; 5; 6} which is the sample space itself, and is, therefore, a certain event.
	In the case of subtask t_4, the response to the task is the option "stop on a primary color", considering that the random experiment is: spin the wheel shown in the figure and see what color it stops on. Thus, the sample space of this random experiment is the primary colors: yellow; blue; red. Thus, it is not certain that the yellow color will come out. Among the options indicated in the problem, selecting a primary color indicates a certain event, since all three colors on the wheel are primary colors. According to Franco (2022), primary or pure colors are those that cannot be obtained through other mixtures. The primary colors are: Yellow; Blue; Red. In this problem, it is necessary to know what primary colors are in order to identify the correct answer.
	In the case of subtask t_5, the response to the task is the option "Pick a blue pen", considering that the random experiment is: Pick one of the five pens shown in the figure. The sample space for this random experiment is five blue pens, all the same. It is not possible to pick up a black or red pen, since there are none shown. Thus, among the options indicated in the problem, it is certain that a blue pen will be picked.
	In the case of subtask t_6, the response to the task is the option "pick a doll", considering that the random experiment is: pick one of the toys shown in the figure. We can also verify that there are only dolls among the toys. The sample space for this random experiment is five different dolls. Thus, it is not certain: 1) that a Barbie doll will be picked, as only two out of the four dolls shown are Barbie dolls; 2) that a teddy bear will be picked, as there are none shown. Thus, the event "pick a doll" is certain, since there are only dolls among the possible toys.

Source: Prepared by the authors.

The theoretical-technological discourse (θ1, Θ1), which justifies and explains the τ1 technique, can be explained by MOOC (2017) where a sure event is the one that represents the event that has absolute certainty that it will occur, reinforced by Fonseca and Martins (2011) when saying that the sample space S itself is said to be a certain event.

Assis (2018) describes the thinking of Batanero et al. (2016) when expressing that it is important for the student to realize that the probability will always be a value included in the closed interval that varies from 0 to 1. In addition, it helps the student to understand the notion of probability from the idea of the whole, or that is, the certainty being represented by 100%.

FINAL CONSIDERATIONS

Our proposal, guided by the BNCC (BRASIL, 2018), sought to explore probabilistic concepts from the teaching methodology of problem solving, considering that it enables important achievements and development for students.

For us, thinking about the basic concepts of Probability is a research topic that meets the needs of students in Brazilian elementary education, seeking to contribute to the growth and development of an autonomous, critical, active society that is capable of making decisions based on the information it encounters.

Considering the ATD, its use allowed us to identify a set of praxeologies that made it possible to characterize both the mathematical object (probabilistic) and the didactic approach for such an object. The praxeological organization was composed of four elements:

1. Task (T) and its subtasks (t), which characterized the action required by the proposed problem situation for the question cards in the game. For example, identify and list all possible results of a random experiment (sample space) as well as its events (subsets), in this case, those that are considered certain or sure.

2. Technique (τ), identifies the way of carrying out the task and its subtasks. Each task has at least one technique associated with it. For example, determining sure or sure events which is the sample space itself.

3. Technology (θ), was specified by the set of definitions, properties, axioms and theorems that justify the technique. For example, the technology that justifies the technique is the definition of a certain or sure random event, that is, it is the random phenomenon of experimental realization when its observation always occurs.

4. Theory (Θ) is the field in which technology is justified. In the examples presented, the theory is given by the probability that allows us to describe the events, that is, those in which, starting from a certain random experiment, it generates its sample space and that one of its subsets, the sample space itself, is configured as sure or certain random events.

Thus, for Chevallard (1999), didactic organizations are the responses to these practices, with their two components: “praxis”, which is formed by didactic tasks and techniques, and “logos”, which is formed by didactic technologies and theories.

In the case highlighted in the mathematical and praxeological organization, addressing didactic praxeology for teaching probability aimed at identifying experiments or daily situations, the didactic objective is configured in which players/students expand: (1) Determining all the results of a random experiment; (2) Classifying events, subsets of the sample space; (3) The idea of an event focusing on the estimation of results that are configured as certain or sure.

Andrew (2009), understands that access to problem situations linked to experimentation, and to specific events, gives the student a better understanding of the nature of probability. The author emphasizes that performing experiments helps students differentiate between elements of the sample space and a specific outcome of interest, the outcome of 'success'.

Finally, we emphasize, based on Vásquez and Alsina (2017), that the probabilistic language begins to emerge from the experiences of everyday life, and that it gradually becomes a probabilistic language, in which probabilistic concepts (sure or sure random events) play a fundamental role.

We emphasize that the cards of the game "Playing with Probability" can be used in different ways, depending on the context, and the teacher's objectives. For example, it can be used to:

1) Assess the children's prior knowledge.
2) Introduce a subject that can later be developed with more time in the classroom.
3) Introduce a subject in the classroom and then reinforce it with the game.

In addition, some of the experiments that are proposed in the game cards can be carried out in the classroom, providing an opportunity for intervention in favor of the construction of notions of probabilistic concepts.

We point out that concepts of probability can be more readily understood if students are first exposed to probability through experiments. Conducting probability experiments encourages students to develop a better understanding of probability, grounded in real events, rather than merely computing answers based on formulas.

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