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Emotions Triggered by Children's Literature Images

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***Abstract*—**The role of images/illustrations in communicating meanings and triggering emotions assumes an increasingly relevant role in contemporary texts, regardless of the age group for which they are intended or the nature of the texts that host them. It is no coincidence that children's books are full of illustrations and that the image/text ratio decreases as the age group grows. The vast majority of children's books can be considered as multimodal texts containing text and images/illustrations, interacting with each other, to provide the young reader with a broader and more creative understanding of the book's narrative. This interaction is very diverse, ranging from images/illustrations that are not essential for understanding the storytelling to those that contribute significantly to the meaning of the story. Usually, these books are also read by adults, namely by parents, educators, and teachers who act as mediators between the book and the children, explaining aspects that are or seem to be too complex for the child's context. It should be noted that there are books labeled as children's books, that are clearly intended for both children and adults. In this work, following a qualitative and interpretative methodology based on written productions, participant observation, and field notes, we will describe the perceptions of future teachers of the 1st cycle of basic education, attending a master's degree at a Portuguese university, about the role of the image in literary and non-literary texts, namely in mathematical texts, and how these can constitute precious resources for emotional regulation and for the design of creative didactic situations. The analysis of the collected data allowed us to obtain evidence regarding the evolution of the participants' perception regarding the crucial role of images in children's literature, not only as an emotional regulator for young readers but also as a creative source for the design of meaningful didactical situations, crossing other scientific areas, other than the mother tongue, namely mathematics.

***Keywords*—**Children's literature, emotions, multimodal texts, soft skills.

I. Introduction

WORDS and images are essential components in literature and scientific communication. Their functionalities are interconnected to varying degrees. However, we tend to see texts and images as separate entities, despite their potential for interconnection. Indeed, texts can transcend their conventional boundaries and assume roles commonly associated with images, and images can occupy functions traditionally reserved for texts.

In literature, we use words to create narratives, awaken emotions, and stimulate the imagination, using images for similar purposes or as a complement to clarify and deepen a given textual message. When writing a text, we may use a visual composition and typographic choices that extend the message far beyond the confines of the words themselves. This can be realized through a variety of techniques, namely through the manipulation of font attributes like size, color, and style. Moreover, the use of creative layouts and arrangements increases the potential to invoke emotions in the reader. This may be achieved by emphasizing particular words or producing a visually rhythmic text [1]. These techniques allow a written message to reach the reader in an immersive way, given the power of the visual effects coupled with it. The popular saying "a picture is worth 1,000 words" means that an image can provide more information than a written text and be more efficiently and quickly perceived [2]. An image can also promote the understanding of concepts even before they are formally expressed, which is not surprising because, as John Berger says, "Vision comes before words. Children look and recognize before being able to speak" [3].

In science, words and pictures, together, work to communicate complex concepts, increase understanding, and spark intellectual curiosity. The words serve as the basis for explanation and exploration, but images (graphs, diagrams, and illustrations) disclose patterns, illustrate mechanisms, and clarify abstract concepts.

Undoubtedly, words and images are heavily connected in literature and science. Together they shape narratives, clarify concepts, trigger emotions, and promote understanding.

Research studies centered on illustrated children's literature predominantly emphasize its influence on children's cognitive development. However, engagement with picture books also enriches young people's perception of the world, offering paths for exploration and involvement in valuable social interactions [4]. Furthermore, children's literature often employs narratives that immerse young readers in emotional experiences, providing an exceptional environment for acquiring emotion regulation skills. This occurs naturally, without the requirement of verbal articulation or deepening of emotions beyond their essential scope [5], [6]. However, children's ability to transfer knowledge from picture books to real-world situations may be limited by their development in symbolic understanding, analogical reasoning (thinking that relies upon an analogy), and understanding of what distinguishes fantasy from reality [7].

The multimodal and visual nature of children's picture books has been extensively explored in studies spanning diverse domains [8]. Frameworks employed in these studies consider a range of modalities, including visual, textual, and graphic design elements and their interrelations. The increasingly complex interactions among these diverse modalities prompted a pressing need to reconceptualize their operational dynamics within distinct educational and social contexts [9].

The image/text ratio in literature and scientific books generally decreases with increasing age of the reader. This fact is due to several interrelated factors, namely, the reader's cognitive and socio-emotional development, learning preferences, and the complexity of the book's content.

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For children still developing their reading and writing skills, the illustrations act as visual cues that help them understand and engage with the book's content [10]. As the age range of readers increases, their cognitive skills, such as vocabulary and comprehension improve, allowing them to process textual information more easily. Their ability to think abstractly and conceptually increases, making it possible to handle complex ideas, analogies, and correlations that exclusively emerged from the book's textual elements, thereby reducing the need for visual aids. Also, readers become more proficient at extracting meaning from written language, preferring textual information over images and valuing the depth of analysis, argumentation, and narrative complexity. The progressive reduction of images prepares readers for the academic, socio-emotional, and professional challenges of adult life.

According to the World Health Organization, a significant percentage of the world's population lacks effective strategies to deal with their emotional problems, with more than 40% not knowing how to deal with this type of problem and 50% not taking any action to solve them [11]. The annual number of suicides due to emotional disorders approaches one million. Above that, the number of children and adolescents with emotional disorders has grown alarmingly, making it urgent to find approaches that involve increasing positive emotions and mitigating negative ones [12].

Illustrations in children's literature can assist children in expressing and regulating their emotions. Picture books containing images associated with emotions allow children to explore and express, verbally and orally, their feelings. These books are a privileged means for children's creative development and emotional growth as they learn to recognize and control their emotions based on the extraction and assimilation of examples and guidance provided and illustrated in the book. As stated in [13], picture books can foster empathy (the ability to understand other people's emotions) in young children. Picture books with captivating and engaging illustrations also possess the remarkable faculty to induce a sense of tranquility within children [14]. These illustrations act as a warmhearted embrace, offering comfort and helping children defeat complex or distressing circumstances.

The study reported here is related to the need to understand the perception that future teachers of Portuguese Basic Education have about the role of illustrations/images in literary and non-literary books, especially those designed for children, and how these can constitute precious resources for emotional regulation.

II. Cognitive Theories and Visual Representations

The understanding of how cognitive processes cross with the use of visual representations is vital in teaching and learning contexts.

One of the theories that addresses this connection is the Dual Coding Theory (DCT), introduced by Allan Paivio, based on the assumption that memory involves two independent channels or codes, with interconnections, for processing information, [15], [16]. One of the channels is associated with verbal content, and the other with visual one. This theory suggests that when information is presented simultaneously in verbal and visual formats, it tends to be encoded in long-term memory and retrieved more efficiently, as the two codes work collaboratively to create a dual memory trace, increasing the chances of successful information retrieval. In light of this theory, teachers can facilitate student learning by employing DCT principles, providing visual educational resources accompanied by verbal or written explanations enhancing the student's learning experience.

Complementing the DCT is the Cognitive Load Theory (CLT), an instructional theory based on our understanding of human cognitive architecture [17], [18], which provides a theoretical foundation for designing instructional materials to best enhance learning [19]. According to this theory, the load placed on working memory can be reduced by both increasing its capacity or reducing its cognitive load. The working memory, which is responsible for temporarily storing and manipulating information [20], has limited capacity. CLT emphasizes the importance of minimizing the cognitive load on working memory to avoid overload and facilitate comprehension and subsequent retention of information. Visual representations, such as diagrams, graphs, and images, get rid of some cognitive demands from working memory by providing a concise and organized representation of complex information.

Within the domain of cognitive theories, Geary's framework finds alignment with CLT in its investigation of cognitive processes and knowledge acquisition. Geary [21] has proposed a classification of knowledge into two categories: biologically primary and secondary knowledge. Geary asserts that primary knowledge, such as proficiency in the native language and the recognition of gestures, is acquired by humans instinctively, often without explicit guidance. This category also includes generic cognitive skills, like general problem-solving, which are acquired intuitively. On the other hand, secondary knowledge requires effort and direct instructions, being acquired consciously [21], [22]. Secondary skills are, usually, acquired in educational institutions designed to transmit cultural knowledge [23]. An example of secondary knowledge is the contrast between learning to read and write versus learning to listen, speak, and gesture, belonging to the category of primary knowledge.

Visual representations offer a means of facilitating the acquisition of primary and secondary knowledge. Visual representations essentially intuitive, communicate concepts and relationships linked to our natural cognitive processes, making them suitable for helping in the acquisition of primary skills. However, visual representations are also used to simplify complex information, condensing it into understandable visual forms, which is beneficial for primary and secondary knowledge acquisition and facilitates the apprehension and memorization of that information.

As mentioned by Frank Serafini, "to successfully interact with and interpret the meanings of the visual images and graphic designs included in multimodal texts, readers must employ a new set of strategies that go beyond the various cognitive-based reading comprehension strategies used to

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understand written text" [24, p.86].

III. Multimodal Texts

Multimodal texts combine multiple modes of representation, including textual elements, imagery, audio, and video, to effectively communicate information and narratives. These texts are designed to engage several sensory channels to articulate ideas, evoke emotions, and unfold narratives more dynamically and effectively. When interacting with multimodal texts, readers develop several skills, including visual interpretation and critical thinking.

The relationship between readers and multimodal texts, including visual elements, highlights the importance of visual perception and visual literacy in the interaction process.

The perceptual processes and sociocultural contexts in which a multimodal image or text is viewed are central to understanding the meanings that readers construct. Achieving an in-depth understanding of a multimodal text requires the reader's ability to integrate distinct perspectives, thus allowing the discernment of elaborate and subtle meanings.

By visual perception, we mean the process of interpreting and making sense of visual stimuli. It is a dynamic cognitive process in which our brain automatically filters, discards, and selects information, comparing them with previously stored records [25], [26].

Visual literacy involves the ability to interpret, analyze, and communicate visual elements with proficiency. It goes far beyond mere visual perception, incorporating an understanding of contextual factors. In this process, meanings are generated through interactions with multimodal compositions that include written texts, images, and design elements, considering different perspectives to meet the requirements of particular social contexts [27].

Picture books for children are ideal resources to lead children to experience rich emotional experiences. Through the vivid power of their illustrations, these books promote a close connection between young readers and the characters in the narrative, establishing a stimulating environment that facilitates the gradual understanding of emotions, and providing them with emotional regulation strategies. Despite the notable inherent potential of picture books to explore emotions, as highlighted by [28], this potential, to a large extent, has gone unnoticed.

IV. Method

Aiming to gain insight into how university students enrolled in the 1st year of the Master's Degree in Basic Education and Mathematics and Natural Sciences at a Portuguese University conceive the meaning of images in literary and non-literary illustrated books; and how these students view illustrations regarding their influence on children's emotional well-being, and on the design of creative didactic scenarios, an exploratory qualitative, descriptive, and interpretative study [29] was carried out with students of the curricular unit Complementary Mathematics II. With those objectives in mind, the following research questions (RQ) were considered:

RQ1. How do future teachers of Portuguese Basic Education perceive the impact of illustrations/images on the engagement and comprehension of children and adults when reading literary and non-literary books designed for the corresponding age group?

RQ2. How do the perceptions of future teachers of Portuguese Basic Education align with current research and educational theories concerning the cognitive and emotional impact of illustrations/images in educational materials?

RQ3. What challenges did future instructors encounter in designing learning scenarios based on the illustrations/images found in children's books?

To answer the research questions, students were asked to carry out a project with the main intention of researching the importance that illustrations have in literary and non-literary texts, with the objective of creating learning scenarios to develop, among others, mathematical ideas and soft skills, in students in the 1st and 2nd cycles of Basic Education, based on illustrations from the literary text "From outside to inside and from inside to outside".

V. Data Analysis

Based on the written works, their presentation and discussion, as well as the analysis of the students' performance during their execution, an analysis was carried out focusing on three topics: the impact of illustrations/images: ideas arising from students' search; exploring the cognitive and emotional impact of illustrations/images in educational contexts; challenges in designing learning scenarios based on the illustrations/images in children's books.

The Impact of Illustrations/Images: Ideas Arising from Students' Search

From the works developed by students and essentially from their developed search, it is possible to perceive the reasons that these future teachers valuate to justify the impact of illustrations/images on the engagement and comprehension of children and adults when reading literary and non-literary books. Next are presented some of the reasons pointed out by students.

Students considered that children's literature plays an important role in the child's development, with the relationship between text and image playing a vital function in childhood since the target audience has not yet mastered the process of reading and writing fluently. In the presented works, in addition to presenting children's literature as a resource to stimulating children's love of reading, is highlighted its role in the development of numerous skills in the cognitive, social, and emotional domains, due to, namely, some features: helps in the development of children identity, creating strong references in them; it is a "window" to discover the world around the children; promotes integrated learning involving various areas and domains of knowledge; is a vehicle for affective and emotional education; encourages children to play an active role in building their own knowledge; enables children to understand the meaning of their own lives. At these ages visual

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resources are crucial pointed out by students for the following reasons: facilitate the appropriation of information and communication; improve the understanding of the text and the construction of implicit or explicit meanings in it; educate the eyes to develop the visualization process as a powerful aid to cognition; the message or concepts can be presented not only with strength or clarity but also in an imaginative, creative way, developing these skills in children; arouse curiosity in children and capture their attention; are more easily retained in memory.

The students' research also focused on the need to answer some questions such as: What is the function of illustrations/ images in a literary or non-literary text?; what characteristics should be considered when analyzing an illustration/image?

In the works presented by the students, the difference in the function of illustrations is highlighted when considering literary and non-literary texts, respectively. Regarding non-literary texts, attention focused on school manuals, being pointed out the following functions or characteristics: it is a pedagogical resource; considering, in particular, mathematics, represent abstract ideas, assist in the understanding of definitions of mathematical concepts and the understanding and solving of problems; promote visual literacy regarding the students' ability to critically read the images contained in teaching materials; when the subject is complex, visual information is more easily understood and remembered when necessary; make communication about the subjects more summarized; transmit messages that cannot simply be expressed in words.

In literary texts, students refer to the progression of the functions of illustrations or images, noting that they no longer serve only to visually show what the text says, having started to gain a privileged space in literature, becoming a complement and not just a prop of the text, recognizing a true interaction and a relationship of dependence between image and text, making both responsible for the narrative. Considering the existence of different degrees of relationship between the written text and the images, the students considered a classification model according to [30] and [31]. Following the ideas of Painter et al. [30], the verbal and the visual modes in a text can be characterized as convergent (when they produce similar meanings); complementary (when one of the semiotic modes contributes additional meanings to those promoted by the other); divergent (when the two modes promote contradictory meanings) [32]. According to Azevedo [31], books can be classified as textbooks (without images, with the occasional exception of illustrations on the cover, in which the verbal text is the communication route); text-image books (with verbal and non-verbal text, with images playing a secondary role); mixed books (with verbal and non-verbal text, in which both play a central role in the construction of meaning and complement each other); image-text books (with verbal and non-verbal text, with the written text playing a secondary role); image books (without written text, in which everything that is presented and told is done through images).

The importance that illustrations assume in a literary text, especially in children's literature, leads students to recognize the enormous responsibility, on the part of teachers, in selecting the books to work on, that is, they felt the need to learn to interpret and understand illustration as well as its articulation with text. The function of illustrations/images in children's books is not linear or unique, an image can not only replace text, but also expand it, add information, or even question it. Therefore, it is necessary to know the variety of functions that an image can assume so that it is possible to predict their impact on children's imagination. In this sense, from students' search, based in [33], were identified as functions of images in children literature: representative (imitate the appearance of the character to which they refer); descriptive (represent the character's appearance in detail); narrative (situate the character represented through transformation or actions); symbolic (when it suggests a meaning superimposed on its referent, even if arbitrarily); expressive (when the feelings and values of the image producer are revealed or when the emotions and feelings of the represented character are highlighted); aesthetics (emphasizes the form of the visual message, its beauty); playful (orients towards games or humor); conative (recipient-oriented with the aim of influencing their behavior); metalinguistics (the referent of the image is visual language); phatic (emphasizes the role of your own support); punctuation (text-oriented, signaling its beginning, end or parts, creating pauses or highlighting some of its elements).

According to [33], in addition to considering the function of illustrations present in a text, the work carried out by students also emphasizes the analysis of other aspects/characteristics of images that are equally relevant when choosing a book: coloring (children pay more attention when the illustrations are colorful, with vibrant colors); size (when an illustration is too small, it becomes difficult to show it when reading or telling a story); realism (must be possible understand whether an image is realistic or not); characters' expressions (in the vast majority of cases, the characters' expressions are not described in verbal speech, being transmitted through graphic-visual speech); contribution (the illustration must contribute to the story, not just being a copy of what is written in the text, but must transgress and show details not reported in the textual discourse).

Exploring the Cognitive and Emotional Impact of Illustrations/Images in Educational Contexts

After searching the impact of illustrations and images on the development of cognitive, emotional, and social skills, the students analyzed the potential of the children's book "From outside to inside and from inside to outside", by Ana Breda and Catarina Cruz, in the development of mathematical ideas in students in the 1st or 2nd Cycles of Basic Education, according to the Portuguese education system.

Firstly, the students analyzed the proposed book according to the researched theoretical foundation, having identified two predominant types of text-image relationship in the book according to the classification of Painter et al. [30], namely convergent and complementarity, justifying that most illustrations either corroborate or complement the information present in the written text. According to Azevedo [31], students classified the book as mixed, considering that the written text and images are both protagonists.

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The students highlighted the relevance of the illustrations/images from the book "From Outside to Inside and Inside to Outside" in transmitting messages that cannot simply be expressed in words, being described as "anchors" to awaken the imagination and to reinforce the emotions felt by the character. Regarding the possible functions of the illustrations in the book under analysis, considering Massoni's [33] classification and analyzing the various illustrations, the students identified the following functions, justifying them with concrete examples from the book: representative; symbolic; expressive; aesthetics; and phatic. According to the characteristics of the images, highlighted by Massoni [33], students classified the book's illustrations as: with coloring; the size of the illustrations is significant, being double-page illustrations are easily viewed; considering realism, the book brings together illustrations that show both realistic and non-realistic features, according to its function at each point in the story, without influencing the attribution of meanings by the reader; the main character's expression is very present in the illustrations, both in facial expressions and in body expressions, translating what is not described in the written text; the illustrations contribute to the story, sometimes transgressing the written text, presenting more details.

To answer the question "How can mathematical skills and soft skills be developed through the book "From outside to inside and from inside to outside", in children attending the 1st and 2nd cycles of Basic Education?", students presented possible learning scenarios integrating didactic proposals based on the reading of the book.

In the learning scenarios developed by the students, those that resulted from emerging and divergent thoughts, respectively, were distinguished. Emergent thoughts are those that arise naturally, that are directly guided by the information provided, and that occur in most people who have access to the same information. Emerging thoughts give rise to ideas that are not very innovative and devoid of great creativity. On the other hand, divergent thoughts arise from the unexpected crossing of previous knowledge, from various areas of knowledge, when obtaining information, giving rise to unlikely ideas that, inevitably, stimulate creativity and imagination.

Fig. 1 Book's illustration

Fig. 2 Book's illustration

From book's image analysis, were pointed out as illustrations resulting in emergent mathematical ideas, examples such as those presented in Figs. 1 and 2. From Fig. 1, the counting and measurement of time in hours naturally follows, for example, while from Fig. 2, the orange refers to geometric shapes and symmetries, for example. Two examples of learning scenarios presented by students and resulting from divergent thoughts resulted, respectively, from the analysis Figs. 3 and 5.

Fig. 3 Book's illustration

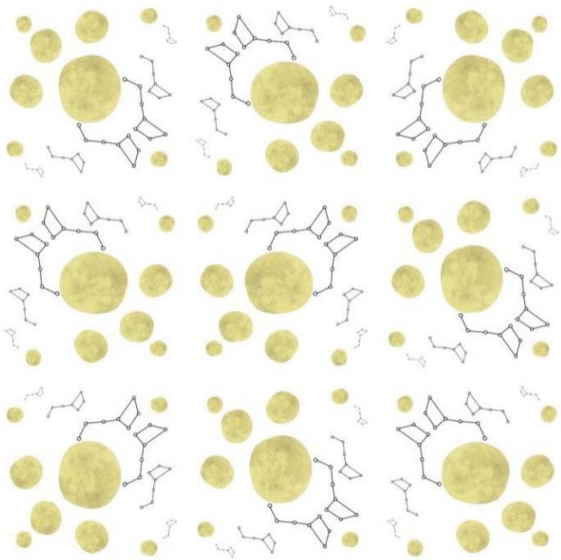

Fig. 4 Artist creation from book's illustration

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From Fig. 3, using GeoGebra's software, students created the image presented in Fig. 5, which resulted from the moon and the constellation by application of homotheties and isometries. The proposed learning scenario is directed to children in the 4th year of the 1st cycle of Basic Education and has as its principal aim to explore the geometric movements and transformations that allow them to reproduce the image in Fig. 4 starting from the moon and the constellation.

In this students' proposal, in addition to being possible to approach geometric shapes and their properties, homotheties, and isometries, it is also possible to develop soft skills such as problem-solving; mathematical communication; critical thinking and creative thinking; interpersonal relationships and collaboration; aesthetic and artistic sensitivity. This didactic proposal allows the exploration of mathematical ideas integrated with the arts.

The illustration in Fig. 5 suggests to students the heartbeat. In this sense, a learning scenario based on the illustration was proposed, with the main objective of analyzing the children's heartbeat.

This didactic proposal is directed at children in the 4th year of the 1st cycle of Basic Education and it would be carried out during a school period, through the weekly collection of each child's heartbeat, with the purpose of, at the end of the period, representing and analyzing the collected data. During the collection and analysis of the data, each child may establish a possible association between the number heartbeat per minute and the emotions felt on those days. This learning scenario promotes integrated learning in several areas of knowledge, in particular, the organization, processing, and analysis of data, in the field of Mathematics, and the human body in the field of Environmental Studies. In addition to developing cognitive skills, this proposal also aims to develop soft skills such as: interpreting and organizing information; solve problems; communicating efficiently; critical thinking; personal development and autonomy; and awareness and control of the body.

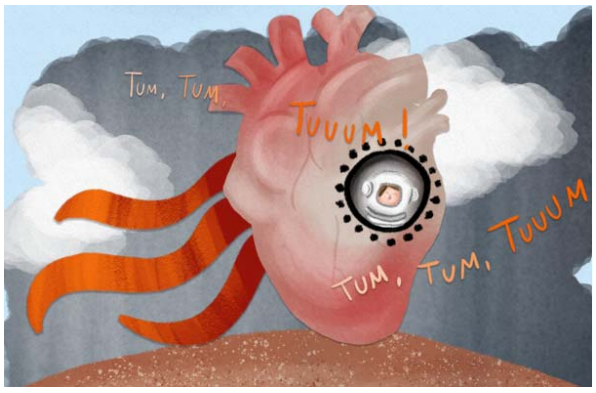

Fig. 5 Book's illustration

Challenges in Designing Learning Scenarios Based on the Illustrations/Images in Children's Books

Students are aware of the demands and challenges that today's world places on education, referring to issues such as sustainability, interculturality, innovation, creativity, the development of multiple skills, and multiple literacies, as being central in today's educational contexts. Faced with the necessary challenges in the educational system, students reveal in their works the relevance of working with children not only skills in the cognitive domain but also in the emotional and social domain.

When the analysis of children's books was proposed, in particular the analysis of their illustrations/images, to analyze their potential as a pedagogical resource to develop mathematical concepts and soft skills in an integrated way, students reported that they had never reflected deeply about what was being asked to them. The students also add that the proposed work made them aware, as future education professionals, of the relationship between text and image, in a literary or non-literary text, and their contribution to the creation of learning scenarios. The lack of knowledge about the subject proved to be a challenge for students, "forcing" them to search for information about it.

In general, students recognize children's literature as a powerful pedagogical resource, with immeasurable potential to promote the child's active role in building their own knowledge, when used correctly and effectively by the educational agent. Faced with the challenge of working in a field little explored by students, they developed soft skills such as critical thinking, in the search for information and in the analysis of a literary book; creative thinking, in the development of divergent thoughts based on the analysis of illustrations and in the design of interdisciplinary learning scenarios; communication, both between peers in the work group when discussing issues, and when transmitting ideas in writing or orally; collaborative work, since the work was carried out in a small group.

In their reflection, students refer to the relevance of adapting pedagogical practices to the profile that is intended to be developed in a 21st-century student, considering the use of children's literature interesting in promoting the development of cognitive, emotional, and social skills, in stimulating and challenging contexts, especially in the first years of schooling.

In the presented works, there is a reference to the interference that technology can have on the use of books printed on paper. If, on the one hand, especially at an early age, sensory reading and children's contact with books through their eyes and touch are important, on the other hand, the digital format allows the movement of images, altering the child's interaction with the book and its illustrations. Technology is also highlighted by students as being an ally in creating images.

Regarding the relevance of working on mathematical concepts through art, in particular through illustrations, students also highlight the fact that sometimes some mathematical concepts are present in the process of constructing images, for example when geometric figures are used, as in creations by Wassily Kandinsky. To apply the ideas developed to a broader artistic context, the students thought of other examples of art from which it would also be possible to create learning scenarios involving mathematical concepts, namely through ceramics and their decorative patterns.

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VI. Conclusion

The works presented by the students reveal that until they were asked to reflect and research the impact of illustrations/ images on the engagement and comprehension of children and adults when reading literary and non-literary books, they had not yet explored in depth the influence that images can have on the development of knowledge and skills. The students' lack of knowledge regarding the subject in question stimulated the need to research it, with their attention falling on: aspects of children's development that can be influenced using illustrations/images; functions of illustrations/images in a literary or non-literary text; characteristics that should be considered when analyzing an illustration/image. Regarding the advantages of using illustrations/images, especially in literary texts for children, the different works highlight numerous aspects, from capturing children's attention and motivating them, to representing everyday ideas from which it is possible to stimulate integrated learning, particularly involving mathematics. Regarding the research of theoretical support to better understand the functions of images and how to analyze them, the groups were based mainly on the ideas of Massoni [33], Painter et al. [30], and Azevedo [31].

In the work proposed to the students, they had to direct the learning resulting from their research towards the design of learning scenarios, aimed at students in the 1st and 2nd cycles of Basic Education, involving the reading and exploration of the children's book " From the outside in and from the inside out", aiming to explore its cognitive and emotional impact in children. At this stage of the work, and considering the proposed children's book, from the analysis of some images, mathematical ideas arise immediately from emerging thoughts. Thus, to stimulate students' creativity and critical thinking, they were asked to create learning scenarios resulting from divergent thoughts regarding some images, that is, in which there were no elements that guided the students' thinking toward mathematical ideas, but that emerged from a more in-depth and creative analysis. Despite never having carried out a task of this scope, the students created learning scenarios in which they explored mathematical ideas unlikely to arise from the analysis of the chosen images, having responded to what was asked and showing a critical and creative spirit.

In the reflection about the realized work, students pointed out the proposed task as a big challenge, since the work involved many unknown subjects, visions, and practices, that they had never had contact. The power of children's literature as a pedagogical resource was highlighted by the students, recognizing this methodology as relevant in developing pedagogical practices having in mind the profile of a 21st century student, and the development of cognitive, emotional, and social skills. Students also detached that during this work's realization, further acquired knowledge on the subject, they developed several soft skills such as critical and creative thinking, communication, and collaborative work.

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