

## Authorship of digital narratives: An experience in teacher education



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### ABSTRACT

In 2022/2, a hybrid improvement course was offered for teachers in training, who are volunteers and students from various degrees of a higher education institution. The general objective of the course was to encourage the authorship of short stories in natural language written in the standard norm and

the development of computational thinking, through the translation/remediation of these short stories into interactive digital narratives, with the use of Scratch. Strategies provided in a didactic sequence were used to account for the entire process of authorship and translation/remediation, to generate data for subsequent content analysis, following indicators found in the specific literature on text production and computational thinking. As a result, it was found that the participants appropriated the techniques of creative writing and the strategies of computational thinking, with some difficulties, which were demonstrated in the process of their productions.

**Keywords:** Creative writing, Digital narratives, Computational thinking, Remediation.

## 1 INTRODUCTION

Both the language written in the standard norm and the operations linked to computational thinking currently occupy a prominent place in several academic discussions (ALMEIDA, 2020; BROACHED; HORNINK, 2020; CASTRO, 2017; CRUZ, 2016; SILVA; BROACHED; HORNINK, 2018; SILVA; HORNINK, 2019; STELLA, 2016; ZANETTI *et al.*, 2017) due to its importance in the formation of autonomous people, capable of understanding and proposing their own solutions to numerous challenges of modern life. Thus, it is of paramount importance that teachers in training, that is, who will work with future students of basic education, have in their trajectory the opportunity to reflect and appropriate the processes involved in the task of promoting the conscious use of written language in the standard norm and in other linguistic varieties, as well as to become familiar with the operations of computational thinking.

In this perspective, in the second half of 2022, a training course was offered for teachers in training of various degrees from a higher education institution. The objective of the course was to promote the strengthening of the student as an author of children's fables in natural language written in the standard norm and the development of computational thinking, through the translation/remediation of these fables into interactive digital narratives, with the use of Scratch. With this objective in mind, the improvement course was structured in order to stimulate the practice of



issues inherent to the authorship of texts in natural language, written in the standard norm, within the scope of the textual genre fable and, through the remediation/recoding of these texts, carried out with the help of Scratch, exercise the operations of computational thinking. that involve data structuring strategies and creating algorithms that enable the solution of specific translation/remediation challenges.

Thus, with the purpose of organizing the course of the educational experience and the recording of the methodological process and the results, this report was divided into four sections, in addition to this introduction. In the section called "Theoretical Foundation", the conceptual foundations that guided the procedures adopted in the improvement course are exposed. In "Methodology", the components of the didactic sequence used are presented, which provided the participants with an intense experience of the suggested model. In "Discussion of the Results", we discuss the evidence found in the students' productions regarding the appropriation of the concepts worked in the improvement course, regarding the mechanisms of creative writing and operations of computational thinking. Finally, in "Final Considerations", the results obtained are highlighted and possible directions for future investigations are suggested.

## 2 THEORETICAL BACKGROUND

The procedures adopted in the improvement course followed the precepts of active methodologies. In this context, Moran (2018) points out that:

Deeper learning requires frequent practice spaces (learning by doing) and opportunities rich environments. Therefore, it is important to stimulate multisensory and value students' previous knowledge to anchor new knowledge. (MORAN, 2018, p. 3).

In other words, with the use of the concept of learning by doing, the student is urged to engage with his learning more effectively, instigated by curiosity and motivated by the prospect of his own qualification. Regarding the previous knowledge mentioned by Moran (2018), it is important to highlight that the participants of the improvement course, which is the object of this report, did not have specific training, neither in creative writing techniques nor in operations that involved the use of computational thinking strategies for problem solving. Thus, study modules were planned in the procedural evaluation phase of the adopted didactic sequence, which addressed, in a practical way, the most basic concepts of these two areas of knowledge, and then advanced to more complex techniques. In this regard, João Mattar (2017) makes the following observation:

[...] assessment should be integrated into the learning process, accompanying the learner continuously, not being limited to a grade at the final moment, but involving frequent *feedback* and not limited to numbers. It is also necessary to evaluate not only the student, but also the teacher and the adequacy of the teaching plan to the proposed objectives. It should also include self-evaluation (by the teacher, colleagues, professionals, specialists, etc.) and self-evaluation. (MATTAR, 2017, p. 97).



Thus, it can be seen that formative and summative assessment, in the context of active methodologies, become instruments of growth for the student and of constant reflection for the teacher about their pedagogical practices and strategies.

In this line of thought, Koch (2020), Wood (2017), Cristóvão and Stutz (2011) and Beaugrande and Dressler (1981) identify several strategies of textual production that make communication efficient, such as cohesion, coherence, situationality, informativeness, intertextuality, intentionality, acceptability, narrative focus, character creation, space and time. With the necessary adaptations for each case, the identification and systematization of these strategies can generate useful criteria for the evaluation of texts, in their different approaches.

Cohesion is the result of linguistic and textual elements present in the utterance, which make it intelligible, such as: 1) anaphoric references: references to terms or ideas already mentioned in the text; 2) connectors: words and expressions that establish relationships between ideas, such as "in addition", "on the other hand", "according to"; 3) repetition of terms: repetition of important words or phrases to establish relationships and strengthen the cohesion of the text; and 4) organizational patterns: structuring the text into paragraphs and using headings and subheadings to facilitate comprehension. Textual cohesion is important because it helps keep the reader's attention, makes the text more understandable, and reinforces the message the author wants to convey. In addition, a cohesive and coherent text conveys to the reader that the author has mastery over the subject and that the text has been carefully planned and written.

Textual coherence is the ability of a text to convey a clear, coherent, and cohesive idea, with a logical and consistent structure. In other words, it is the quality of a text in presenting ideas and arguments that fit and complement each other, forming a coherent message. According to Koch (2020), the concept should also be extended to the reader:

Coherence is not only a criterion of textuality among the others (and centered on the text!), but is the result of the confluence of all other factors, allied to mechanisms and processes of a cognitive order, such as encyclopedic knowledge, shared knowledge, procedural knowledge, etc. What has been defended is that coherence results from a construction of the users of the text, in a given communicative situation, to which all the factors presented here contribute, in a relevant way, along with others that we will now specify. (KOCH, 2020, p. 52).

Textual coherence is established through several elements, such as: 1) logical structuring: order of ideas, use of conclusions and introductions, in addition to the organization of the text into paragraphs; 2) semantic cohesion: relationship between the ideas and concepts present in the text, forming a coherent unit; and 3) consistency of tone and style: consistent use of a tone and style throughout the text, helping to maintain the coherence of the message. Textual coherence is important because it allows the reader to understand the message of the text clearly and objectively, helping to



convey the author's intent. In addition, a coherent message increases the author's credibility and helps to keep the reader's attention.

Textual situationality is the context in which the text is embedded, including the circumstances, conditions, and social, cultural, historical, and linguistic relations that influence it and determine its form and content. Textual situationality is important because it influences the meaning of the text and its ability to communicate effectively. This includes: 1) social context: social relationships between those involved in communication, including social and cultural norms; 2) historical context: historical and cultural circumstances that influence the production and interpretation of the text; 3) linguistic context: use of language, slang, jargon, etc., which are influenced by the culture and history of the language; and 4) context of production: motives, purpose and objectives of the text, including the target audience and the communication channel. Understanding textual situationality is important for a better interpretation and comprehension of the text and to avoid misunderstandings or misinterpretations.

Informativeness refers to the ability of a text or speech to convey information and knowledge to the receiver. In other words, the more informative the text is, the greater the amount of information and knowledge it conveys. Informativeness can be influenced by a number of factors, including: 1) writing style: a clearer and more straightforward style tends to be more informative than a more complex or abstract style; 2) organization of the content: the clear and logical organization of the content can help to make the text more informative; 3) detail: the more details the text provides, the greater its informativeness; and 4) Use of examples: Using concrete and easy-to-understand examples can help make the text more informative. Informativeness is important in various contexts, including journalism, education, business, and science, as it is reflected in the reception and understanding of the content of the utterance.

Intertextuality encompasses the extent to which the production and reception of a given text requires knowledge of other texts in order for comprehension to be effective. Intertextuality refers to the presence of other texts or discourses in a current text or discourse. This can include explicit references to other texts, quotes, parodies, allusions, stylistic influences, among other things. Intertextuality can be used in a variety of ways, including: 1) to establish relationships with other texts: for example, by quoting another text, the author can establish a relationship with it and provide context for his or her own work; 2) to enrich meaning: intertextual references can help to give additional depth and meaning to the current text; 3) to explore social and cultural issues: by making references to other texts, the author can explore relevant social and cultural issues; and 4) to develop irony or sarcasm: intertextuality can be used to create irony or sarcasm, for example, when parodying another text. Intertextuality is an important part of literary culture and tradition, as it allows authors to establish relationships between their works and other works, and makes it possible for readers to understand and appreciate the additional depth and meaning that these relationships can offer.



Textual intentionality refers to the author's intention or purpose in writing a text or speech. It is the goal or effect that the author hopes to produce on his audience or receiver. Textual intentionality can include: 1) convincing or persuading the audience to adopt an opinion or position; 2) inform the public about a specific subject; 3) entertain the audience by making them laugh, cry or get emotional; 4) describe a situation, person, or place; 5) express the author's emotions or feelings; and 6) connect emotionally with the audience. Textual intentionality is important because it helps determine the way a text is written and how it is received by the audience. Understanding the author's intentionality can help readers interpret the text more accurately and appreciate it more fully.

Textual acceptability refers to the ability of a text to be accepted or understood by the audience or receiver. This includes the extent to which the text is considered clear, coherent, relevant, and appropriate to the context and expectations of the audience. Textual acceptability is influenced by several factors, such as: 1) the use of language: the text should use clear and concise language, avoiding jargon or words that are difficult to understand; 2) cohesion and coherence: the text must be organised in a logical and coherent manner, maintaining a logical link between ideas and information; 3) relevance: the text should be relevant to the context and expectations of the audience, addressing issues that are important and interesting to them; and 4) the communicative situation: the context in which the text is produced and received can affect its acceptability, including factors such as the relationship between the author and the audience, the place and time of communication. Textual acceptability is important because it affects the ability of a text to achieve its communicative purpose and to be understood and appreciated by the audience. When a text is acceptable, it is more effective at communicating its message and producing the effect desired by the author.

Narrative focus is the narrator's perspective or point of view that is used to tell a story. It is the way the story is told, and it is an important element that influences how the reader perceives and interprets the events of the story. There are three main types of narrative focus: 1) first-person narrative focus: the story is told by the main character, using the first person ("I"). For example, "I saw that man running through the streets"; 2) Omniscient third-person narrative focus: The narrator knows everything about all the characters and events in the story and can get into the minds and emotions of the characters. For example, "she was scared but decided to go for it"; and 3) limited third-person narrative focus: the narrator only knows what the main character knows and can see and does not have access to the emotions and thoughts of the other characters. For example, "he saw that man running through the streets." Narrative focus is an important choice the author makes when telling a story, and it can significantly influence how the reader perceives and connects with it. For example, if the author chooses the narrative focus in the first person, it may allow the reader to have a more intimate and personalized view of the story, whereas, if the author chooses the narrative focus in the omniscient third person, it may allow the reader to have a broader and more global view of the events of the story.



Character creation is a crucial part of writing a short story. Characters are responsible for driving the action of the story and drawing the reader into the plot. To create successful characters, the author must consider the following: 1) personality: defining the characters' personalities, including their values, beliefs, motivations, fears, and desires; 2) physical appearance: description of the physical appearance of the characters, including their size, shape, hair color, etc.; 3) *backstory*: creating a previous story for each character, including their upbringing, work, family relationships, etc.; 4) internal conflict: attributing internal conflicts to the characters, such as contradictory desires or fears, to make them more three-dimensional and interesting; 5) dialogue: use of dialogue to show the personality and motivation of the characters, as well as advance the action of the story; and 6) action: assigning actions to characters that reflect their personalities and motivations. In addition, it is important for the author to develop realistic and coherent characters, with characteristics and actions that make sense within the story. Creating successful characters can elevate the plot of a tale and make the reader emotionally connect with the story.

The creation of fictional space involves the construction of an imaginary world that serves as the setting for a story. This space can be as detailed as the author desires and can include elements such as geography, architecture, culture, technology, etc. When creating a fictional space, the author should consider the following: 1) coherence: the space should be coherent and consistent, without elements that contradict each other; 2) relevance to the story: the fictional space must be relevant to the story and affect the action and characters in some way; 3) Detailed description: the fictional space should be described in detail, including the geography, architecture, culture, etc., so that the reader can visualize it clearly; 4) Immersive environment: An immersive environment that allows the reader to be emotionally involved with the story should be created; and 5) Own personality: the fictional space should have its own personality, making it more three-dimensional and interesting. Successfully creating a fictional space can help transport the reader into the world of the story and increase their immersion in the narrative. Additionally, a well-developed fictional space can provide a unique atmosphere and complement the action and characters in the story.

Fictional time is the timeline of the story that is created by the author. It's an artificial construct that doesn't necessarily follow the actual timeline. Fictional time can be presented in a variety of ways, such as linear, non-linear, realistic, fanciful, among others. The author can control the pace of the story by speeding up or slowing down the action, and can explore various eras, eras, or imaginary worlds. The choice of fictional time can profoundly affect the story, giving it a unique structure, purpose, and atmosphere. Additionally, fictional time can be used as a narrative device to highlight the importance of the story's events and to establish the relationship between characters and events. Fictional time can also be used to explore thematic issues, such as the past, present, and future, or to make comments on the nature of time and space. In summary, fictional time is a key part of creating a story and can be



used as an element to enhance the narrative, create a unique atmosphere, and explore important thematic issues.

That said, when translating natural language into a digital narrative in an environment that uses computational thinking strategies, such as the Scratch environment, it should be borne in mind that communication with computers, unlike communication with humans, is made up of rigid protocols. This means that the production of machine language is associated with programming languages, through which specific instructions are given, thus allowing the steps organized in the algorithms to be coded. Therefore, from the point of view of the author of the encoding, there is the production of a code and, from the point of view of the interpretant (machine), there is the decoding and execution of the orders contained in that code. That said, it's called an algorithm:

The sequence of structured, unambiguous, and finite steps to solve a specific problem. From this angle, the algorithmization process uses a series of strategies of human thought, which, systematized with a view to its implementation through computational artifacts, integrates computational thinking, which still has abstraction, pattern identification and decomposition as basic elements. Computational thinking implies, therefore, discipline to systematize and organize the solution to a problem. (FOOHS et al., 2021).

From this angle, the construction of the algorithm, which consists of a problem-solving approach in such a way that the solution found can be executed by a computer, is an essential part of computational thinking. In this way, students, by exercising computational thinking, become not only computer users, but also authors of solutions through programming strategies.

It is to be expected, however, that, in the translation/remediation process for Scratch, the language that had been written in the standard norm migrates to a more concise linguistic variety, typical of the new context built in the digital narrative, without prejudice to the textual macrostructures, which are the set of ideas organized in a coherent and hierarchical way to present a message in a clear way. The preservation of these textual macrostructures is essential so that the essence of the text is not lost. In this line of thought, Girmen, Özkanal and Dayan (2019) are used to define the concept of digital narratives:

Digital storytelling, which is a functional approach of integrating writing skill with technology, is also used to enrich learning environments. There are many different definitions of digital storytelling, but in general, they all revolve around the idea of combining the art of storytelling with a variety of digital multimedia. (GIRMEN et al., 2019, p. 55).

Therefore, and considering the context of this exploratory research, which, in the translation/remediation of natural language into an interactive digital narrative, integrated written language with multimedia elements in an authorship environment that uses programming, it should also be recognized the need for operative abstraction on the part of the participants that enables the



decomposition of the whole, the recognition of patterns and the structuring of data. in order to build an efficient algorithm, through computational thinking strategies.

At this point, it is appropriate to reflect on the human-to-human communication process, based on Austin's (2020) theory of speech acts. The theory of speech acts, or theory of verbal acts, is a philosophical theory developed by Austin in the early twentieth century. According to the author, when communicating, people not only convey information, but also perform verbal acts, such as promising, asking, commanding, teaching, thanking, counseling, and so on. Austin's theory is important because it highlights the cultural and performative dimension of language. For Austin, in a speech act there are three distinct acts: 1) locutionary act: corresponds to the utterance itself; 2) illocutionary act: corresponds to the communicative intention that the speaker performs when performing an utterance in certain communicative contexts; and 3) perlocutionary act: corresponds to the effects that a given illocutionary act produces on the person who receives the utterance.

Thus, in the context of this report, the locutionary act consisted of a statement of the fable genre written in the standard norm. The illocutionary act consisted of the message that the author wanted to convey with the fable, having in mind an elementary school audience and, finally, the illocutionary act, which consists of the impact of the fable on the target audience, was not evaluated in this study. In this regard, it is important to emphasize that, when we consider the utterance as a means that carries a communicative intention, we can no longer be content to evaluate a text only by its characteristics of cohesion, because, if the grammatical structure employed, no matter how correct it may be from the point of view of the standard norm, does not serve to adequately convey the message intended by the author, This structure compromises the text in the purpose of communication for which it was composed. Thus, the textual evaluation must have adequate instruments that account for the harmonic whole.

With these characteristics of speech acts in mind, we can apply the same reasoning to translated texts for interactive digital narratives with the aid of Scratch. There is no point in having a cohesive and refined codification if it does not carry within itself the author's communicative intentionality. In other words, coding is at the service of communication. Therefore, as for the text written in natural language according to the standard norm, for interactive digital narratives, it is necessary to have an evaluative instrument capable of accounting for the coding of the algorithm and its adequacy to the author's communicative intention.

### 3 METHODOLOGY

In 2022/2, a hybrid improvement course was offered, with a workload of 40 hours, for twelve teachers in training, who were volunteers and students from various degrees at a higher education institution. In this participatory exploratory research, the didactic sequence adopted, in order to account





for the research objectives and generate data for subsequent content analysis, included the formative assessment phase and the summative assessment phase. In the formative assessment phase, in which modules addressing the fundamentals of creative writing were studied, fables were produced for an elementary school audience and basic computational thinking strategies were exercised in the Scratch environment. In the summative evaluation phase, a fable and a digital narrative were chosen to be evaluated according to criteria adapted from the specific literature. Thus, the phases included: 1) formative evaluation phase: creative writing modules, choice of themes, collaborative authorship of a fable, appropriation of Scratch functionalities and recoding of a short story authored by the participants for digital narrative with the use of Scratch (division into scenes, data structuring, construction of the algorithm); and 2) summative evaluation phase: summative evaluation of a short story and a digital narrative chosen by the participants, using the content analysis method (BARDIN, 2021).

In the formative evaluation phase, there was a presentation of the characteristics of the fable genre with examples for reading and discussion in the large group. Then, there was the choice of themes with the help of a creative writing kit prepared by De Mari and Oliveira (2021). Subsequently, the participants, gathered in groups of up to four people, wrote a fable and obtained feedback from their colleagues regarding the content and form for the improvement and rewriting of the texts. Once the texts were finished, there was a period of appropriation of the Scratch functionalities through the translation/remediation of a fable chosen by the researcher. Finally, the participants chose one of the fables previously worked by them, to be translated/remediated by the large group into an interactive digital narrative with the help of Scratch.

In the summative evaluation phase, Bardin's (2021) content analysis method was used, which is a qualitative data analysis technique that allows identifying and understanding the meanings implicit in texts. The method is based on a systematic approach, involving three main phases: the pre-analysis, the exploration of the material and the treatment of the results. In the pre-analysis phase, the researcher establishes the objectives and questions of the research and defines the study population. In the exploration phase of the material, the researcher reads and encodes the material in order to identify the relevant concepts and categories. In the results treatment phase, the researcher interprets the collected data and generates conclusions and recommendations.

Thus, in this participatory exploratory research, the objectives were: 1) to strengthen the teacher in training as an author of children's fables written in natural language, according to the standard norm; and 2) develop computational thinking through the translation/remediation of these fables into interactive digital narratives, with the use of Scratch. Thus, the research questions were established as follows: 1) what elements present in the analyzed texts demonstrate the appropriation of the fable genre? 2) What textual elements denote the use of the standard norm in the service of the expression



of ideas? 3) What translation/remediation strategies denote the development of computational thinking at the service of interactive digital storytelling?

In the exploration phase of the material, it was decided to read and codify the fable chosen and worked by the large group, in its final draft, after having been rewritten several times, with the incorporation of peer reviews. In the same way, the interactive digital narrative resulting from the translation/remediation of the fable to Scratch was analyzed. Finally, in the phase of interpretation of the results, some conclusions and recommendations were reached based on what was observed in the fable written in natural language in the standard norm and in the interactive digital narrative resulting from the translation/remediation for Scratch.

#### 4 RESULTS AND DISCUSSION

As previously mentioned, none of the participants had content related to creative writing processes or computational thinking operations in their academic background. Therefore, all the concepts worked on in the improvement course were novelties, often out of the students' comfort zone. That said, the fables produced collaboratively by the participants, whose themes addressed "fear" and "dealing with unpleasant things", had, with the advancement of the modules of the formative assessment phase, several versions. In this sense, it follows, in its final version, the fable entitled "Will I go?", chosen by the students to be translated/remediated by the large group for a digital narrative, with the help of Scratch.

Chart 1 – Fable written by the participants and chosen for remediation

**WILL I?**

"WOW, WHAT A GIANT WAVE!" – said the little turtle Lili, after coming out of her egg, on the white sand beach, under a blue sky the color of the sea.

**Reading Mediator:**

It is customary for mother turtles to leave nests with many baby turtle eggs on the edge of a beach, inside a hole they make themselves, so that when their young are born, they can run towards the sea and find their way home!

Lili saw her brothers running fast, as fast as turtles know how to run, towards the immensity of the ocean to have fun in its waves, but she could not get out of the place, held back by her imagination.

"I'm not going into that sea! How will I know if I can swim? What if I drown?"

Her little brother Taz, while running, noticed that Lili was still standing in the same place, with a scared face.

"RUN LILI, COME AND SEE THE SEA WITH US!" – Taz shouted.

Even though she heard her siblings' shouts of joy – "UHUUUU!", "EBAAA!", "PLAYING IN THE WAVES IS SUPER FUN!" – Lili remained trapped in her fear.

"Never! I won't! These scary waves give me a hell of a fear!" – Lili dug her paws into the sand, having decided that she would never get out of there.

Taz really wanted to see the sea, but he didn't want to abandon his little sister.

"Lili, I get it. You're very afraid of the sea, but aren't you also afraid of never venturing into something new?"

"Why, of course I do!" said Lili.

Taz continued:

"Don't you think it's bad to miss the opportunity to know something really cool, that can make you happy, just because of the fear of trying?"

"Hmmm," Lili replied thoughtfully.



"Yes," said Taz worriedly, "for every fear, there will be a greater one! AND ANOTHER, AND ANOTHER, AND ANOTHER... WOW!!!! There will be so many fears. But we can at least try to overcome all of this by thinking about the adventure we're missing!"

Lili thought and thought, until she spoke her greatest fear: "But Taz, what if I don't know how to swim?"

**Reading Mediator:**

*Can Lili swim? What do you guys think? Why?*

"What nonsense," said Taz, "you're a turtle! It's in your DNA to be able to swim! But if you get too scared, I'll be by your side to help you and we'll face it together!"

Even though she felt a twinge of courage with Taz by her side, Lili still hesitated, "Will I?"

Until, finally, he went to the big sea, dived into the cold water and played a lot with his brothers. A pink star from the bottom of the sea approached Lili and asked her name. Then came a goldfish and a stingray too! The new friends joined the gang and everyone had a great time. With so much cool play, Lili forgot her fears and swam very well, like a pro! Everyone praised it!

"Ah... If I had known that the sea was so good, had so many surprises and so many friends to make, I would have entered sooner! I'm glad I didn't let fear stop me from participating in this adventure," Lili said gratefully to Taz.

**Reading Mediator:**

*After a lot of playing, Lili and her siblings embarked on the journey of finding their mother to live new adventures and continue exploring the sea, which still had a lot to show them.*

Source: Prepared by the authors.

For the summative evaluation of the fable written in natural language according to the precepts of the standard norm, some of the communication strategies proposed by Koch (2020), Wood (2017), Cristóvão and Stutz (2011) and Beaugrande and Dressler (1981) were systematized in the form of criteria in the second column of Chart 2. In the third column, the text is evaluated according to these criteria.

Table 2 – Summative evaluation criteria of the fable

About the textual production	Analysis criteria	Summative evaluation of the fable
Communication Strategies	Evaluate the adequacy of a text to the situation in which the communication takes place.	The text was designed for reading mediators in a children's context. There are indications of possible interventions, which demonstrates an awareness that the text can be adapted according to the context.
	Take into account social and/or cultural aspects.	The dialogues between the characters Lili and Taz highlight social and cultural aspects regarding the constitution of the family, the value of friendship and the fear of failure.
	Mobilize prior knowledge.	In the interventions of the voice of the "mediator", the authors provide elements of the world so that the reader can better understand the argument of the story.
Storytelling Strategies	Organize the text.	The fable has an impeccable organization, with the plot developing gradually through the climax until a resolution is reached.
	Create the fictional space.	The fictional discursive world created by the authors is coherent and the content is well dosed, without losing the focus of the theme.
Cohesion and coherence strategies	Understand the linguistic elements in the authorship of texts, paragraphs, sentences.	The construction of the text follows the dictates of the language written in the standard norm. The sentences and paragraphs were constructed during the formative assessment phase.
	Use textual coherence strategies.	The story is coherent and believable within the fictional world created.



	Use textual cohesion strategies.	The nominal concordances are impeccable in the written language of the standard norm, as are the references of the anaphora and cataphora type. Verb tenses, parallelisms, and concordances are used correctly. The result is a cohesive text.
	Demonstrate awareness of the different voices that construct the text.	In the text there are clearly different voices: the mediator, Lili and Taz. These voices interact harmoniously.
	Understand vocabulary choices.	Lexical choices, such as the use of diminutives and childish and naïve expressions, are in accordance with the category of children's fable.
	Use strategies of proximity to the reader.	The very interesting creation of the figure of the mediator who interferes in the story makes the reader feel the closeness of the author, who is confused with this observing character.
Strategies of signification	Understand the relationship between texts and the way of being, thinking, acting and feeling of the characters.	The characters have an interesting depth that reveals itself in the dialogues. Lili's fears and Taz's reasons immerse us in the characters' way of being.
	Organize ideas in a coherent way to present a message clearly.	The theme of fear was dealt with in the fable not only in a coherent way, but also in an engaging way, which refers to the reader's fears.

Source: Prepared by the authors.

Next, the participants presented a summary, in the form of a table, of the scenes they decided to include in the translation/remediation of the fable into an interactive digital narrative, with the help of Scratch (Chart 3). This phase of the construction of the digital narrative is part of the development of the capacity to decompose the whole, one of the foundations of computational thinking.

Table 3 – Decomposition of the fable for recoding with the aid of Scratch

Scene 1	Scene 2
<p>The turtles running into the sea. Background: Scenario 1 – beach.</p> <p>Clones of the turtles moving towards the ocean.</p> <p>Strategies in Scratch: - Creation of clones. - Use of conditionals. - Motion control.</p>	<p>Lili stood still in fear. Taz, Lili's brother, notices that she is standing still and calls her into the sea. Background: Scenario 1 – beach.</p> <p>Dialogues: Taz: "Run Lili, come and see the sea with us!" Lili: "I'm not going into that sea! How will I know if I can swim? What if I drown?"</p> <p>Strategies in Scratch: - Synchronization of the dialogs. - Use of conditionals.</p>
Scene 3	Scene 4
<p>Lili and Taz, next to each other talking. Background: Scenario 1 – beach.</p> <p>Dialogue: Taz: "Don't you think it's bad to miss the opportunity to see something really cool for fear of trying?" Lili: "But Taz, what if I can't swim?" Taz: "What nonsense, you're a turtle! It's in your DNA to be able to swim, but if you get too scared, I'll be there to help you!"</p>	<p>Lili and Taz swimming under the sea. Background: Scenario 2 – deep sea.</p> <p>Dialogue: Lili: "I'm glad I didn't let my fear stop me from getting to know this adventure!"</p> <p>Strategies in Scratch: - Slide in random motion. - Synchronized dialogs.</p>



<p>Strategies in Scratch:</p> <ul style="list-style-type: none"> <li>- Synchronized dialog.</li> <li>- Use of conditionals.</li> </ul>	
<p style="text-align: center;">Scene 5</p>	
<p>Starfish hunting game.</p> <p>Strategies in Scratch:</p> <ul style="list-style-type: none"> <li>- Collision of actors.</li> <li>- Use of conditionals.</li> <li>- Actor movement with arrows.</li> <li>- Create clones in different places on the screen.</li> <li>- Movement of the clones.</li> <li>- Point count (variable creation).</li> <li>- Time limit.</li> <li>- Finishing screens.</li> </ul>	

Source: Prepared by the authors.

As can be seen in Frame 3, in addition to the story itself, it was decided that there would be a game called "Starfish Hunting", right after scene 4. The planned sequence for the game was: after the narrative, switch to the Game Scenario (the background remains); move Lili around the stage with the arrow keys; create clones of starfish that move randomly; as Lili touches the stars, the score increases by 1 point; You need to reach 10 points, in a maximum of 15 seconds, to win the game; if you succeed, the scenario changes to "You Made It!"; and, if you can't, the scenario changes to "Restart the Story".


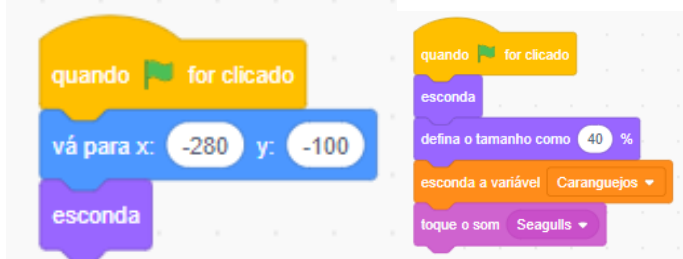
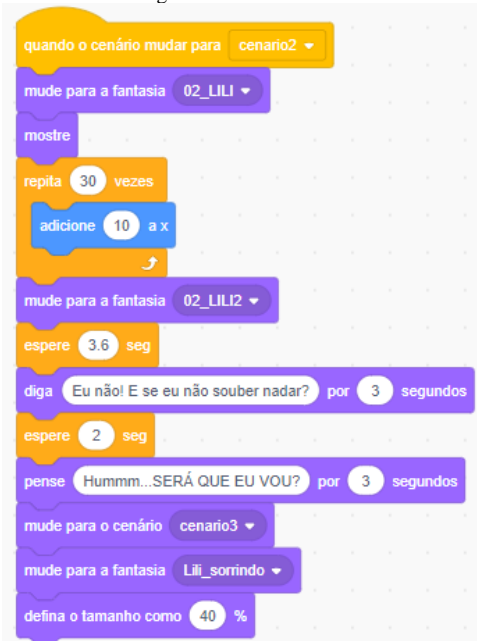
Next, a summative evaluation of the digital narrative and the game is presented, based on the evaluation criteria of the Computer Science Teacher's Association (CSTA) published by Seehorn *et al.* (2011).

Table 4 – Summative assessment of digital storytelling

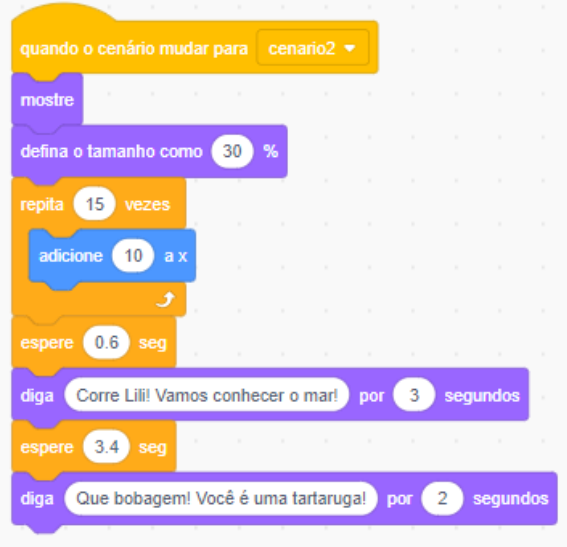
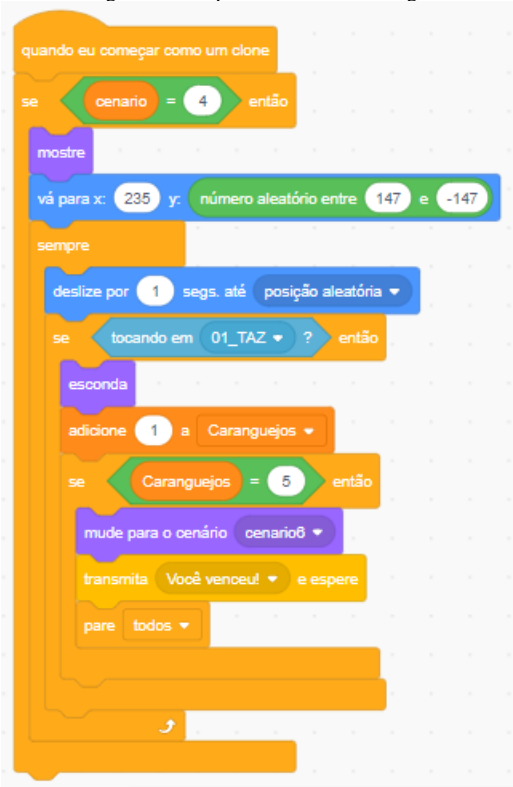
Criteria	Digital Storytelling Assessment
<p>Logic: the use of logical thinking, so that actors behave differently depending on the situation. These instructions aren't as important in stories, because they usually have a linear structure.</p>	<p>One of the actors, the turtle Lili, has different behaviors, depending on the scenes: there is very sophisticated automatic creation and movements of turtle clones, there are synchronized dialogues and there is movement controlled by arrows.</p> <p style="text-align: center;">Figure 1 – Creating Clones on the Move</p>

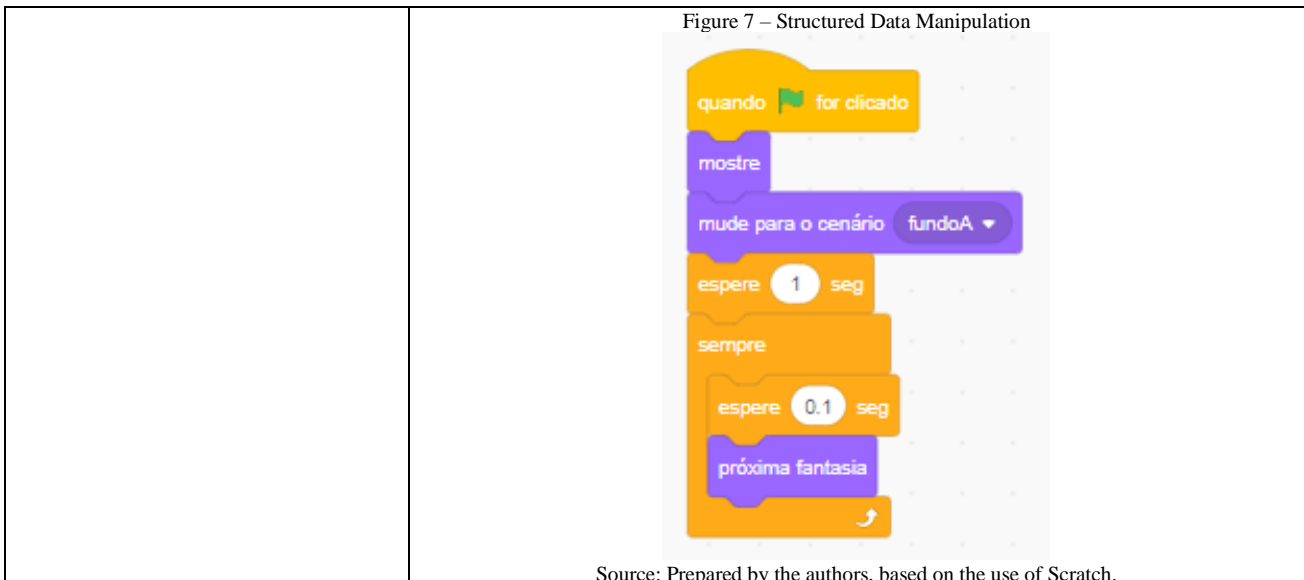
Source: Prepared by the authors, based on the use of Scratch.



<p>Parallelism: is the possibility that several things occur simultaneously.</p>	<p>In scene 5, you can move the turtle around while star clones move around the screen.</p> <p>Figure 2 – Movement of the turtle in the game</p>  <p>Source: Prepared by the authors, based on the use of Scratch.</p>
<p>User interactivity: Control mechanisms that require user action.</p>	<p>In scene 5, the turtle can be moved by the user to hunt for stars. See Figure 2.</p>
<p>Data representation: information about the characters such as position, direction they are pointing, size, etc.</p>	<p>Information about the size and positioning of the actors is passed effectively via code.</p> <p>Figure 3 – Position and size via code</p>  <p>Source: Prepared by the authors, based on the use of Scratch.</p>
<p>Flow control: A program composed of a set of blocks that are executed one after the other.</p>	<p>In the automatic sequences of the narrative scenes, the flow control was used appropriately to tell the story.</p> <p>Figure 4 – Flow Control</p>  <p>Source: Prepared by the authors, based on the use of Scratch.</p>



<p>Synchronization: The easiest way to synchronize the behavior of your characters is by using a "wait" block, which makes the character wait an amount of seconds that is set as the block's parameter.</p>	<p>The characters' lines were effectively synchronized with "wait" blocks, demonstrating the mastery of this technique.</p> <p>Figure 5 – Synchronization of speeches</p>  <p>The code starts with a 'quando o cenário mudar para cenário2' block. It then shows a sequence of blocks: 'mostre', 'defina o tamanho como 30 %', a 'repita 15 vezes' loop containing 'adicione 10 a x', 'espere 0.6 seg', 'diga Corre Lili! Vamos conhecer o mar! por 3 segundos', 'espere 3.4 seg', and 'diga Que bobagem! Você é uma tartaruga! por 2 segundos'.</p> <p>Source: Prepared by the authors, based on the use of Scratch.</p>
<p>Abstraction: the best thing is that the character's behavior is controlled by different programs and that each of them takes care of a particular issue.</p>	<p>The fictional world created and its representation by natural language and computational thinking strategies show a high capacity for abstraction.</p>
<p>Pattern recognition: grouping of similar data into structures that allow its use through the strategies used in the construction of the algorithm.</p>	<p>Pattern recognition occurred effectively, which enabled the correct use of loops and conditionals that optimized the algorithm, avoiding redundant codes.</p> <p>Figure 6 – Loop and Conditional Usage</p>  <p>The code starts with 'quando eu começar como um clone'. It has a 'se cenário = 4 então' block. Inside, there is a 'mostre' block, a 'vá para x: 235 y: número aleatório entre 147 e -147' block, and a 'sempre' loop. The loop contains: 'deslize por 1 segs. até posição aleatória', 'se tocando em 01_TAZ ? então' block, 'esconda', 'adicione 1 a Caranguejos', 'se Caranguejos = 5 então' block, 'mude para o cenário cenário6', 'transmita Você venceu! e espere', and 'pare todos'.</p> <p>Source: Prepared by the authors, based on the use of Scratch.</p>
<p>Data structures: The ways in which data is aggregated and organized are called data structures. Proper data structuring gives efficiency to the algorithm's processing.</p>	<p>The participants correctly structured the data in tools embedded in the Scratch authorial environment, which enabled the creation of actors' movements and the transition of backgrounds using computational thinking strategies in the construction of the algorithm, capable of interacting with these structures to manipulate the data contained in them.</p>



Source: Prepared by the authors.

It is noteworthy that these summative assessment results refer to the final versions of the natural language text chosen by the participants and its translation/remediation into an interactive digital narrative. On the way to the final versions, however, there were some difficulties that were briefly dealt with below. In the fable written in natural language according to the standard norm, there was difficulty with anaphoric references. Sometimes the anaphoric referent was ambiguous, and it was difficult to identify the correct term to which it referred. At other times, there was a great distance between the anaphoric referent and the term to which it referred, the reader lost the previous reference and had difficulty understanding the text.

Students also struggled with parallelism, which is a writing strategy that consists of using the repetition of similar syntactic structures to create a sense of balance and order in writing. For some participants, creating parallel sentences was difficult. Parallel sentence construction requires skill and sensitivity to find the best way to organize and repeat sentences coherently. In addition, the difficulty also arose in the choice of words and expressions used in a similar way and that conveyed the same meaning.

Another striking difficulty of the text, in its first version, was regarding the situationality with regard to the linguistic and social context. The initial text was loaded with sophisticated descriptions with a vocabulary far beyond what can be required of an elementary school student, which made reading painful. With the various revisions and rewrites, the text acquired more lightness and the story came to life with short dialogues that reveal the essence of the complication and its solution.

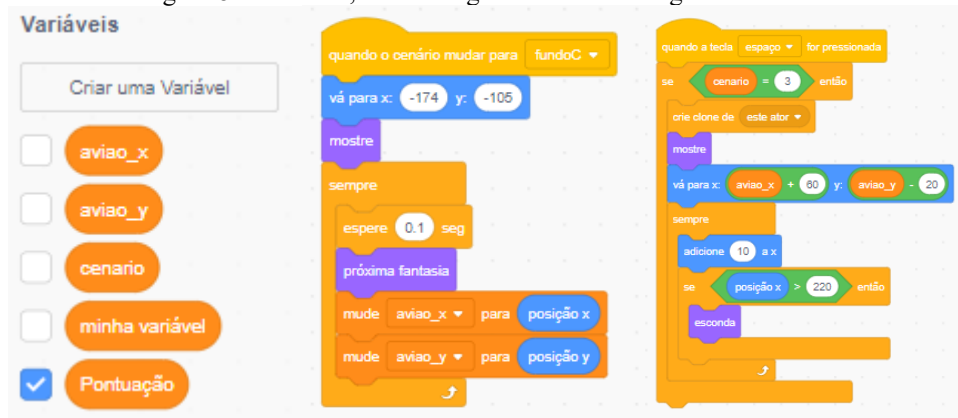
As for the interactive digital narrative, there was difficulty in understanding the mechanism of creation and movement of the clones. There was also a fairly common mistake of coding one character into another's screen, but that primary mistake was soon overcome. The most persistent difficulty came when the concept of the global variable was introduced to pass the value of an actor's location to clones





of another actor. It is well known that the concept of variables is abstract and difficult for some people to visualize. Although the explanation was made in a clear and concrete way, it was a great challenge for many to understand that one could assign the value of the local variables "position x" and "position y" of one actor to global variables and pass these coordinates to clones of another actor through the global variables so that they could follow the first actor and be triggered from it by the space bar (Figure 8).

Figure 8 – Creation, value assignment and use of global variables



Source: Prepared by the authors, based on the use of Scratch.

Another confusion also occurred with the use of comparison operators rather than value assignment operators along with global variables (Figure 9). Understanding this dynamic was difficult for some students and led to tense moments.

Figure 9 – Comparison Operators Used with Global Variables



Source: Prepared by the authors, based on the use of Scratch.



## 5 FINAL THOUGHTS

In this report of experience in the classroom, a didactic sequence was described that has translation/remediation as its axis, around which the language written in the standard norm is articulated with the authorship of an interactive digital narrative. In this didactic sequence, the appropriation of computational thinking strategies is integrated, through the act of translation/remediation, with the development of natural language written in the standard norm and the linguistic variety employed in the interactive digital narrative derived from it. This integration reinforces the recognition of the communicative value of linguistic varieties, strengthens the use of language in the standard norm, and contextualizes the use of computational thinking strategies.

The authorship of the fictional context of the fable "Will I go?" and its representation with the help of the visual programming language of Scratch demonstrated the development of a complex level of abstraction, in which elements of the real world were represented in a fictional world, both by natural language and by the signs of computational thinking in the construction of the digital narrative. In the translation/remediation process, it was clear that the participants used decomposition, pattern recognition, and data structuring strategies to make possible the development of the algorithm that enabled the implementation of digital storytelling in the Scratch environment.

In view of the satisfactory results achieved, it is concluded that the didactic sequence adopted worked adequately for the volunteers participating in the improvement course. From the perspective of future studies, it is suggested to increase the number of participants in an improvement course similar to the one reported in this text, but involving teachers already trained and active in basic education in public schools, in order to take the research into their classrooms, in order to validate the didactic sequence used in this report. completing, with the evaluation of the perlocutionary act, the set of speech acts predicted by Austin (2020).

Finally, it is believed that computational thinking and natural language text production can and should be worked on in all disciplines to expand students' ability to understand and solve problems, design systems, and create knowledge. In particular, the enhancement of computational thinking allows students to develop their potentialities to conceptualize, analyze and deal with complex situations, selecting and applying appropriate strategies and tools, both in the real and virtual worlds.



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