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PRACTICE INSIGHTS

# Potentialities of science comics for science communication: lessons from the classroom

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**Abstract**

The aim of this pilot study was to understand how the use of science comics, centred on complex scientific knowledge, can promote students' engagement with science, in order to discuss its potentialities as a tool to communicate science for the general public. The qualitative study involved 175 students and 7 teachers. The results revealed that the use of comics significantly increases students' motivation and commitment to the learning tasks. All participants highlighted that the narrative nature of comics, with a mixture of text and images, offering a story to follow, contributed to their engagement with the scientific topic, regardless of their complexity.

**Keywords**

Public engagement with science and technology; Science education; Visual communication

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## 1 ▪ Introduction

In the current context of a post-pandemic crisis and the deepening of the climate crisis, any citizen is asked to judge the scientific information about current socio-scientific issues, and to participate in decision-making about critical aspects of our collective life. Within this context, increasing people's interest and involvement in science is a growing concern. Although many researchers seek innovations for promoting public engagement with science, much could be gained by taking advantage of the activities and media that people naturally enjoy during their leisure time. While new media are constantly emerging, comic book reading has remained a popular activity for both children and adults [Farinella, 2018].

The definition of comics has been a subject of extensive scholarly debate, leading to a variety of interpretations. Despite the diversity of these definitions, there is a consensus that comics fundamentally consist of sequential images, with accompanying text being common yet not indispensable [Pratt, 2009]. For instance, McCloud [1993] articulates this concept by describing comics as "juxtaposed pictorial and other images in deliberate sequence, intended to convey information and/or to produce an aesthetic response in the viewer" [p. 20]. This definition highlights the adaptability of comics across various genres, styles, and themes [Abrori et al., 2023]. One particularly notable application of this versatility is found in science comics (SC), which are designed specifically to communicate scientific concepts or educate readers about real-world scientific themes [Tatalovic, 2009].

The educational value of comics is far from a recent discovery. As early as the mid-20th century, scholars recognized their potential to enhance learning. Sones [1944] and Hutchinson [1949] were among the first to explore how comics could be integrated into educational settings, highlighting their effectiveness in engaging students and enhancing literacy skills. Morrison et al. [2002] highlight three main reasons for incorporating comics into educational contexts: they help bridge the gap between students' interests in popular culture and their academic experiences, enhance critical media literacy through their visual storytelling, and naturally engage students due to their widespread popularity. Yang [2003] further emphasizes the advantages of comics in education, noting their ability to motivate learners, their permanence — unlike the transient nature of film and animation, which allows students to control the pace of their learning — and their role as intermediaries in simplifying complex topics. These qualities make comics effective tools for addressing literacy challenges and facilitating learning in various subjects, including science. Recent advancements in digital tools that enable the creation of comics have further amplified their educational potential, offering new ways for educators to engage students through interactive and customizable content [Abrori et al., 2023; Lazarinis et al., 2015].

In science education, comics have proven to be effective resources for deepening conceptual understanding. Research suggests that, when compared to traditional text-based methods, comics not only enhance comprehension but also improve the retention of scientific knowledge [e.g., Aleixo & Sumner, 2017; Topkaya, 2016; von Reumont & Budke, 2023]. Beyond these cognitive benefits, comics can promote interest in science, increase enjoyment, and foster more positive attitudes toward the subject [e.g., Hosler & Boomer, 2011]. Furthermore, they offer a unique avenue for students, particularly those who may not initially see themselves as scientists, to develop a stronger scientific identity [e.g., Spiegel et al., 2013].

According to some studies [e.g. Negrete & Lartigue, 2004], storytelling is an effective way to create an interest in science, due to its capacity to involve readers in their need to reach the

end of the story, and the use of an interpretative language, which encourages imagination, thought and dialogue [Ogborn et al., 1996]. Moreover, the potentiality of the use of humor as a positive emotional hook for increasing the intrinsic motivation to improve interest in and learning of science is well documented [Chen & Hsu, 2006]. According to Chen and Hsu [2006], humor can stimulate learners' positive emotions and creativity, facilitating their attempts to learn. Besides humor, the use of visual representations enhances the understanding of the information [Eilam & Poyas, 2010]. Therefore, according to many authors, science comics can be considered as an important means of conveying scientific information in an attractive, accurate, and comprehensible way [Tatalovic, 2009; Weitkamp & Burnet, 2007]. For this reason, they could be considered an excellent tool to communicate science for any public, besides science students.

However, although this growing interest in SC, the empirical studies that have investigated the effects of comics in science education and communication are limited. While the use of comics appears to be an effective method of increasing students' motivation to study science, research provides very few information on how scientific knowledge is represented, and on the processes through which students select and transform the knowledge presented in these narratives [Bordenave & de Hosson, 2022]. This is especially important because, as revealed by the study of Bordenave and de Hosson [2022], the majority of comics with scientific content, whether used for educational purposes or science communication, tend to present scientific concepts in a way that is often simplified for the sake of the story.

Therefore, despite the long-standing use of SC as an educational tool for learning science, there is a growing need for empirical research on the effects of these visual narratives in science communication [Farinella, 2018]. In particular, it is crucial to assess how SC can promote scientific knowledge that enables students — and the general public — to understand and critically evaluate key aspects of often complex scientific issues [Farinella, 2018]. Moreover, it is important to explore whether, when scientific knowledge is not oversimplified, the interest in and willingness to learn science are still effectively promoted. The current research aims to understand how the use of SC, centred on complex scientific topics, such as evolution and biodiversity, can promote students' engagement with science, in order to discuss its potentialities for being used as a tool capable of bringing people closer to and involved with science.

## 2 ▪ Methodology

### 2.1 ▪ *Context of the study*

The SC used in the research were created within the ECOSCOMICS project. ECOSCOMICS is an Erasmus+ project that involves science education partners from France, Portugal, Spain, Germany, and Poland. This project aims to provide the European science education community with original and motivating teaching resources in the form of a series of eight scientific webcomics for educational purpose, named "The Supertroupers" (Lau Bergey and Barbara Govin, Stimuli Eds, 2023).[1] Each webcomics will be an episode of the series and will be focused on different key scientific concepts and models [Maron et al., 2019]. These materials are addressed to 12–18 years old students. These SC were designed specifically for use in the classroom, adapted to the curricula of each country and based on the research in

1. https://www.supertroupers.eu/en.

science education on the topics involved. For this, the episodes are developed through a collaborative co-creative process, involving science education researchers and comic book authors, in order to establish a correspondence between the scientific content, in all its complexity, the didactical pathway and the SC narrative [Maron et al., 2019].

Overall, the aim of the episodes is to bring out pupils' initial conceptions and stimulate debate in class on a scientific thematic. The narrative is based on a group of 4 secondary school students enrolled in a school drama group, who are asked to perform plays or adapt classic texts of literature in which characters or situations echo scientific themes, allowing the alternation between real-life situations and role-playing on the theatre stage, where the characters can make sense of their previous experience and discussions.

In this study two different episodes, one centred on evolution and the other centred on biodiversity were used. Evolution episode starts with two of the Supertrouper members visiting a Natural History Museum, while discussing on how they will adapt Alice in Wonderland' novel. During this visit, they were confronted with a skeleton that made them question and research how whales have evolved. With the help of a paleontologist, and by presenting some alternative conceptions, the ideas of Lamarck and Darwin, this SC sought to clarify evolution and natural selection mechanism. In the end, the readers are invited to explain how Alice's descendants might have evolved, bearing in mind evolution concepts. In Biodiversity episode, while rehearsing for the play "the Birds", Supertroupers were interrupted by a bee on stage that caused different reactions among the actors. Starting from the discussion of the significance of bees and pollinators, this SC explores the relevance of Biodiversity and its different types, encouraging the reader to reflect on human actions and what can be done to preserve biodiversity.

### 2.2 ▪ *Research approach*

The study involved eight classes with a total of 175 Portuguese students. The SC about evolution was tested with four classes (n = 69, 15–17 years old), in three different schools. The SC about biodiversity was tested with four classes (n = 106 students, 12–17 years old), in four different schools. Both SC were translated to Portuguese, before being used in classes.

In all cases, SC were used in classroom, after the normal exploration of the theme by the teacher, i.e., a science comic was used to review and consolidate learning. The teachers involved (n = 7) used different teaching and learning strategies. In one of the schools, the teacher presented the SC to the whole class, where they had the opportunity to read the comic together. Afterwards, they were given the opportunity to read the SC again in groups of two, and then, students were asked to answer a worksheet where they had to explain, in their own words, the main concepts related to evolution (present in the science comics). In other school, students autonomously analyzed one of the three chapters of the SC in groups and were asked to present the chapter to the rest of the class. In the rest of the schools, the teacher presented the comic, and during its presentation, he/she orally guided students' exploration of the thematic.

The research followed a qualitative approach, using teachers' interviews (n = 7 teachers), focus group interviews with groups of students (five focus group, with four to five students each) and students' individual questionnaires (n = 69 students), for understanding the added value of the SC as a didactic resource and the main characteristics of the SC that motivate

for learning. The questions for students were the same in the focus-group interview and the questionnaire (all open questions) (see appendix A). Students were asked to give their opinion about the story (clarity of concepts and sequence of events), if they liked to use the resource and why, if it motivated them for deepening their understanding about the topic and the difficulties they felt. Teachers were asked, in the interview, to make an overall appreciation of the SC used (clarity of the concepts, sequence of the story) and to evaluate its potentiality as a didactic resource (added value for learning, difficulties felt by students).

All participants previously gave an oral consent for participation. As the use of the comics was part of students' normal formal instruction (it was used by their teachers to consolidate the scientific subject), the parents' permission was not needed. However, all the students were free to refuse their answers to be used in this investigation. The questionnaires were anonymous. All interviews (individual and focus group) were digitally recorded and later transcribed in full.

For analyzing the data a content analysis method was used [Sherman & Webb, 2004]. After reading all the interviews and written answers to the questionnaire, the authors defined the two main key topics (overall strengths and potentialities), and the main categories included in each one (ex. narrative, factual information, visual message). Then, through an iterative process of reading and re-reading data [Miles & Huberman, 1994], meaningful pieces of text were assigned to each of these previously defined categories. These recording units were coded and then grouped into different sub-categories. During cross-check analysis, all differences in the classification between the authors were resolved through discussion until reaching a consensus. In some cases, this resulted in changing or merging sub-categories. In addition, the weight of each category and subcategory was considered, by taking into account the total number of recording units included in each one, over the total number of records included in the respective larger category.

## 3 ▪ Results

The analysis of the students' opinion about the use of these SC in classroom revealed two main key topics: overall strengths of SC (Table 1) and potentialities of using SC as a didactic resource (Table 2).

Considering the overall strengths SC (Table 1), students highlighted different aspects, most of them related with the existence of a story. The main aspects emphasized were the structure and coherence of the story, the presence of characters and dialogues, the innovative way in which knowledge is presented, through a story, and the fact that the scientific concepts are clear and related to concrete examples. Besides, they also referred the importance of the visual message presented by the comics. The following excerpts are illustrative of the importance of the story, namely the will to follow the story until the end and the presence of the dialogues between the different characters:

> "*I really liked the comic because it is very interesting, the characters are very lively, the conversation is gradual, and I want to know what will happen, and they explain many words that I don't know, so I liked it a lot.*" (evolution class)

**Table 1.** Overall strengths of the science comics (in parentheses is the % of the recording units that mentioned each subcategory or category, in relation to the total number of records of the respective category or dimension).

| *Category* | *Sub-category* | *Examples* |
|---|---|---|
| Narrative (57%) | structure/sequence (68%) | ■ It presents a logical sequence that contributes to achieving the proposed objectives (evolution class)<br>■ I think the story is well-structured, with a plot that is easy to follow and understand (evolution class). |
| | characters/dialogues (19%) | ■ The personalities of the characters and the application of science in other areas were the aspects I liked the most (evolution class).<br>■ I think the dialogues in the comic were very clear, and the language was accessible (evolution class) |
| | Innovative nature (13%) | ■ I liked the aspect where this comic related two areas that are not normally associated (science and theatre), as I think it makes the story more interesting (evolution class).<br>■ I find it creative to use a story that relates to the subject matter. (evolution class)<br>■ I liked the originality of using a comic book to approach scientific concepts. (biodiversity class) |
| Factual Information (32%) | clarity of the concepts involved (70%) | ■ The concepts presented in the comic about evolution were quite clear and easy to understand (evolution class).<br>■ gives us the concepts in a more simplified form but with the essentials (evolution class).<br>■ I thought it was interesting to have a comic strip dealing with a more complex subject in a simpler way. (biodiversity class) |
| | with concrete examples (18%) | ■ I really like the inclusion of historical figures so that I could learn more about evolution and its concepts (evolution class)<br>■ the cartoon… gives examples so I can understand them better (evolution class)<br>■ The way you explained what biodiversity was and gave an example. (biodiversity class) |
| | Interesting (12%) | ■ the concepts were… interesting and really held my attention (evolution class);<br>■ how it managed to explain each thing in a way that wasn't too boring and explicit. (biodiversity class) |
| Visual message (11%) | Images (100%) | ■ I loved illustrations (evolution class)<br>■ I really liked the illustration, as I mentioned before. (evolution class)<br>■ Yes, I think I'd be more attentive because of the drawings, I think it captivated me… yes because I think we are in an age when anything can distract you, so I think it made you more focused. (biodiversity class) |

"*I liked the aspect where this comic related two areas that are not normally associated (science and theatre), as I think it makes the story more interesting.*" (evolution class)

"*I liked the comic itself, I liked the story and how it was created.*" (biodiversity class)

"*I liked that it started in the theatre and ended in the theatre too.*" (biodiversity class)

These same characteristics seemed to have an impact on communication and learning of science, in particular by improving understanding, developing some important skills and specially, motivating for learning. Indeed, students' highlighted three key benefits of these SC that contribute to their value as a didactic resource (Table 2): promoting understanding of scientific concepts, enhancing skills development, and increasing students' engagement.

**Table 2.** Potentialities of the science comics as a didactic resource (in parentheses is the % of the recording units that mentioned each subcategory or category, in relation to the total number of records of the respective category or dimension).

| *Category* | *Sub-category* | *Examples* |
|---|---|---|
| Promotes the understanding of concepts, through… (36%) | Concrete examples (21%) | ■ Yes, because it provides examples and that is always good for a better understanding. (evolution class)<br>■ Yes, and it introduced me to examples of the theory of evolution that I had not studied yet. (evolution class) |
| | Illustrations (25%) | ■ it was easier to understand the subject in a visual way (evolution class).<br>■ the illustrations help a lot in understanding the content. (evolution class)<br>■ because in comics there are drawings and it's easier to understand… (biodiversity class) |
| | Narrative (18%) | ■ the story managed to connect the content in a logical way. (evolution class)<br>■ Of course! It allows for a better understanding since it kept us more concentrated, trying to find a way to comprehend the concepts. (evolution class) |
| | Illustrations + Narrative (1%) | ■ from the characters' speeches interrelated with the images, I was able to understand all of Darwin and Lamarck's concepts, even though they weren't explicit. (evolution class) |
| | capturing attention (14%) | ■ (…) and captures the students' attention, so we also find it easier to understand the content of the subject. (evolution class)<br>■ yes, it was easier to understand because it captivates our attention, and we followed the classes better as we were more interested. (evolution class) |
| | Simplicity (21%) | ■ I liked the comics and I was able to pay attention to everything and understand a bit about biodiversity. (biodiversity class)<br>■ it was a simpler way, even though it remained scientific, it was less complex. (evolution class)<br>■ yes, it helped, as it is a simple but captivating way to explain the material. (evolution class)<br>■ what I liked most was its simplicity. (biodiversity class) |
| Enhances the development of skills (16%) | Reasoning and critical thinking (8.5%) | ■ this work helped me… to practise my… reasoning skills. (evolution class) |
| | Raising questions (8.5%) | ■ [I think it is a resource], being good for raising questions. (evolution class) |
| | Reflection (25%) | ■ yes, because it made us reflect again and better on evolution. (evolution class)<br>■ I liked it because it makes us think about the theoretical material taught applied to real life. (evolution class) |
| | Interpretative skills (text) (33%) | ■ this activity helped me interpret texts… (evolution class) |

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| *Category* | *Sub-category* | *Examples* |
|---|---|---|
| | Interpretative skills (images) (25%) | ■ it also improved my ability to analyse images… (evolution class)<br>■ this activity helped me to interpret… images. (evolution class) |
| Increases students' engagement, because it is… (48%) | Fun (35%) | ■ I liked 'discovering the concepts that were implicit in the story'. (evolution class)<br>■ in a very creative and playful way. (evolution class)<br>■ I think it was captivating. (evolution class) |
| | Different (24%) | ■ I liked using comics in class because it was a different way of learning and it made me more interested. (evolution class)<br>■ in a more creative way, which I think helps with concentration throughout the lesson (evolution class) |
| | Interactive (24%) | ■ I found the experience very interesting and interactive, keeping an eye on every detail throughout. (evolution class)<br>■ yes, I thought it was a very interactive and easy way to learn the taught content. (evolution class)<br>■ we had a good interaction with each other, and it's a new way of understanding the subject and it was really cool, I liked the comic strip (biodiversity class) |
| | have illustrations (8%) | ■ not just being text makes it more appealing. (evolution class)<br>■ yes, because it also showed images, not just like in text, but also images. Yes, it was very clear. (biodiversity class) |
| | have a story (6%) | ■ (…) it motivates us more because we're not just reading the manual or powerpoints, we're reading a story. (evolution class)<br>■ yes, especially the fact that it's a story, which made the topic lighter and more motivating to learn. (evolution class) |
| | facilitates understanding (3%) | ■ yes, it motivated me because it helped me understand the contents of evolution better, and therefore, more interest arose in the subject. (evolution class) |

The promotion of scientific concept understanding is attributed to different characteristics of SC. Participants mentioned the narrative structure, visual engagement, and multimodal nature of comics (integrating text and images) as influential factors. Additionally, the simplification and clarity of concepts, along with the integration of concrete examples, were highlighted as contributing to better understanding. It should be noted, however, that these same characteristics were pointed out by some students, as being aspects that hinder the understanding of the subject:

> "*The concepts (about evolution) were well applied but a bit vague but since it's a comic it shouldn't have too much information either.*" (evolution class)

> "*In certain aspects, it approaches some subjects in a very superficial way*" (evolution class)

> "*I think the topic was covered very superficially, because the thematic was much more developed at school.*" (biodiversity class)

Some students also noted that their improved understanding was due to the comics' ability to capture their attention, as illustrated by the following quotes: "*Yes, it was easier to understand because it captivates our attention (…)*" (evolution class); "*I liked the comics and I was able to pay attention to everything and understand a bit about biodiversity.*" (biodiversity class)

It is worth mentioning that students considered that this contribution for the understanding of the scientific topic could occur even for someone not an expert in science, as illustrated by the following excerpt:

> "*The concepts presented implicitly are clear and easy to identify and understand. A person who has never talked about it can certainly get some information out of the cartoon.* (evolution class)

> "*I think it was interesting to have a comic strip dealing with a more complex subject in a simpler way.*" (biodiversity class)

Regarding the potential of SC to promote the development of skills, participants highlighted the development of reasoning, creative and critical thinking, and text and images interpretative skills. This use of an interpretative language seemed to promote imagination, thought and meaning making:

> "*(…) from the characters' speeches interrelated with the images, I was able to understand all of Darwin and Lamarck's concepts, even though they weren't explicit.*" (evolution class)

> "*Certainly! Because I think the drawings don't take up much attention, making it easier to gather information and think. This way, I can better use my imagination to try to explain these interesting questions.*" (evolution class)

Finally, students' engagement and motivation to learn appear to stem from the enjoyable and interactive nature of science comics. Participants expressed that the comics are fun, light, and different, demonstrating that learning can be more enjoyable. The interactive and easy-to-understand format, coupled with narrative storytelling and visual elements, further contribute to students' enthusiasm for this learning resource, as illustrated by their own words:

> "*Yes, especially the fact that it's a story, which made the topic lighter and more motivating to learn.*" (evolution class)

> "*I find it creative to use a story that relates to the subject matter. Therefore, I consider the sequence of the story quite interesting.*" (evolution class)

> "*I liked the originality of using a comic book to approach scientific concepts.*" (biodiversity class)

It is worth mentioning that all these three dimensions do not seem to act in isolation. On the contrary, they seem to be totally interconnected, i.e., increased motivation helps understanding, just as better understanding favours motivation, as illustrated by some of the students' answers:

> "*Yes, it was easier to understand because it captivates our attention, and we followed the classes better as we were more interested.*" (evolution class)

> "*Yes, it motivated me because it helped me understand the contents of evolution better, and therefore, it sparked more interest in the subject.*" (evolution class)

The teachers interviewed seemed to agree with this view of the importance of presenting the scientific knowledge embedded in the visual narrative, for the excellence of this SC to be used as a didactical tool. Indeed, they highlighted the fact that it presents scientific concepts in a creative way, arousing students' interest, concentration and motivation, because it has a story and it is fun, as illustrated by the following excerpts:

> "*What I liked most was the original way the story was presented, the concepts were not explored directly, but in a way that was understandable, easy to follow and, above all, fun.*" (Prof. SB & IF)

> "*I liked the 'mystery' element that pervades the story. I enjoyed the case of the evolution of whales.*" (Prof. P)

> "*The whole joke, the whole joke behind what's going on, the whole message behind the comic strip (…).* (Prof. M)

Moreover, teachers highlighted the importance of the story to be related with concrete situations of our life, as the evolution of whales (in the case of the evolution episode) and the disappearance of bees (in the case of the biodiversity episode)

> "*The challenge of having to apply the concepts of evolution to a "real" example stimulated the students' critical thinking.*" (Prof. SB & IF; Prof C)

> "*Essentially, the exploration of concepts from concrete cases (bees and whales) that pose real problems for researchers. This is already done frequently (at least I do it), but not in the format of a comic book, which can be motivating due to its distinctiveness and serving as a 'surprise' element.*" (Prof. P)

> "*Often they say 'what are we studying this for?' and here there is one example, there's no need for them to ask, because they saw in the story that there are also these aspects in our day-to-day lives and that they often must deal with these situations in real life.*" (Prof. Di)

However, as already stated by some students, two of the teachers mentioned the fact that being a story, it cannot go too deeply into the scientific concepts involved, which on the one hand, gives great flexibility to the resource, on the other, may create some difficulties in terms of learning.

> "*In both cases, there isn't much depth, but I believe that will be up to the teacher. In other words, this aspect is a 'strength' of comics because it provides them with flexibility, but it can also be a limitation because it requires research and the search for implementation solutions by the teacher.*" (Prof. P)

> "*When I saw the cartoon I really thought it was quite simple for this purpose, because it doesn't have most of the concepts that they need to know.*" (Prof. Da)

In general, it seems that both students and teachers very well received these SC as a didactic tool, mainly because they are based on a visual narrative, supported by scientific knowledge, which promotes scientific understanding in an enjoyable and simple way. The narrative nature of the science comics, presenting a story applied to concrete and real situations, illustrated by images, seemed to contribute to enhance their engagement with the topic.

## 4 · Discussion

The results revealed that from the students' perspective, the use of these comics significantly increased their motivation and commitment to the learning tasks. Indeed, they turned out to be a resource with enormous educational potential, since they promoted a better understanding of the complex scientific concepts and a deeper connection with the topic, by retaining students' attention and promoting students' reflection and creativity. All these are essential aspects that should be part of a resource to be used to communicate science [Burns et al., 2003]. According to Burns et al. [2003] model, science communication aims to enhance public scientific awareness, understanding, literacy, and culture by building AEIOU responses (Awareness, Enjoyment, Interest, Opinion-forming, and Understanding of science). Indeed, awareness, enjoyment and interest are important factors related to self-learning engagement [Laukenmann et al., 2003; Lin et al., 2015]. This enthusiasm, promoted by these science comics, was attributed to factors such as their novelty and

creativity. Considering the comic itself, both students and teachers highlighted the interest of having a mixture of text and images, and the fact that it has its own narrative, a story to follow, in which scientific concepts are incorporated in a clear and simple way.

The results obtained in this study revealed that the cornerstone of these type of resources, a science comic, centred on complex scientific knowledge, was precisely to have a story, built on relevant scientific knowledge and developed around real issues and facts. According to Jee and Anggoro [2012], this narrative structure could make scientific material easier to comprehend, mainly because the content and structure of narratives is similar to our everyday experiences. Therefore, the story of SC seems to have the potential to engage readers on both affective and cognitive levels [Hinyard & Kreuter, 2007]. Despite this evidence, narratives are still rarely employed in scientific communication [Farinella, 2018], which usually prefers to adopt an impersonal expository and/or argumentative structure [Norris et al., 2005; Wellington & Osborne, 2001]. However, in our view, in order to guarantee an effective, and affective, public engagement with science, it is essential to create and use creative and challenging resources, capable not only of promoting the enthusiasm and involvement that science deserves, but also to ensure a greater and correct understanding of scientific knowledge on complex issues, that could be vital for modern societies.

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## A ▪ Teachers’ interview

1. How do you characterize the class in which the comic strip was implemented?
2. What do you think about the suitability of the use of this comic strips for the age level of students, their grade level and curriculum?
3. Given the sequence (story) presented, what is your assessment about: a) the clarity of the concepts about the scientific thematic, b) the sequence of the story presented
4. In general, which aspect did you like the most? And what was the least liked?
5. Do you think that this comic strips can be an added value for student’s learning about the scientific thematic? In what way?
6. Identify the aspects that could make it more difficult for students to learn about the scientific thematic, and those that could make it easier?
7. What do you think this resource can bring new to the teaching of the scientific thematic?
8. Can you briefly describe how you have used comics in your lesson(s).

## B ▪ Students' interview

1. What is your school year?
2. Did you enjoy using comics in class? Justify
3. What do you think of this comic strip in terms of: a) the clarity of the concepts about the scientific thematic, b) the sequence of the story presented
4. In general, which aspect did you like best? And what did you like least?
5. Did using the cartoon motivate you to learn more about the scientific thematic? Justify
6. Did using the comic strip help you to understand the scientific thematic? Justify
7. What do you think is the main idea about the scientific thematic that you have developed through this comic strip?
8. What were the main difficulties you experienced using this comic strip in class?

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