

***Changing Behaviours Through Design:  
An Educational Comic Brochure to Help Prevent Childhood Obesity***

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**Abstract**

Communication implies engagement with the message, and it becomes more relevant when the primary purpose is to educate while having an entertainment experience. Based on the literature review, we know what types of illustrations will capture most of the attention of specific age groups. This project aims to develop a set of artefacts to increase children's literacy concerning childhood obesity. Therefore, being illustration the most suitable method for our materials, we surveyed to evaluate children's preferences based on four illustrations previously selected by a panel of experts. Our target group was children between 8 and 12 years old. Based on our results, we identified the preferred illustration style for 8-10 years old children and 10-12. Also, we verified differences in the chosen illustration per gender. This project integrated research undergoing in HEI-Lab, Lusófona University of Porto and was developed in the academic context, evolving undergraduate students and professors from Physical Education and Communication Design. These pedagogical approaches proved to be an added value for students, resulting in a compelling opportunity for them to work on a real-life project and see their work recognised, published, and used by the community as a valuable resource for children, educators, and doctors.

Keywords: Child Obesity, Health and Well-Being, Comic Brochure

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## Introduction

Illustration and comic books stimulate readers through a mix of different design elements. This is one of the reasons why they are used not only as entertainment products but also, often, as didactic material to support children's literacy.

*Yes* aimed to create a comic brochure to be playful and didactic, following edutainment learning strategies that propose a compelling mix of education and entertainment so that the target audience learns quickly and engagingly. In this case, reading a comic book promotes literacy about healthy eating and physical exercise.

As the first stage of this project is the most visual and least interactive, as it is expected that this project develops and progressively engages children in more immersive activities, the research team's focus was on producing a practical object, either in the language used, appropriate to the age group in question and in the choice of graphic style to be used.

It is possible to have an empirical idea of what kind of illustration will be most suitable for each age group or to follow general trends. Still, the decision-making must be more grounded, despite possible difficulties in this definition. Studies show that human preference has differences and instability throughout life stages; adults have more defined personal aesthetic preferences and children under ten and adults over 65 show less stable aesthetic preferences. Over two weeks, the consistency of personal preference proved to be tenuous even in adults and even less in children [1]. It should be noted, however, that the existence of inconsistencies in children's choices and preferences is something consistent and attributed to a question of what children consider novelty as well as to be conditioned by the repetition of questions of priorities and comparison, as proven in psychological child development studies conducted by Hinton Bradbury [2].

However, to maximise its effectiveness, it is necessary to understand what captivates the target children and their specific needs seasonally and aesthetically [3]. Individual aesthetic preferences and predetermined age groups result from a combination of preferences regarding colour choices, shape, spatial structure and composition [4]. These factors influence children's choices and preferences in picture books, correlating criteria of attraction, theme and form.

There is a consensus on the definition of 3 stages of development of aesthetic appreciation, with the first, at ages up to 8 years old, there is a general attraction to colour and interest in the subject and, from the age of 8 to a greater degree—the realism of forms and the relevance of the theme [5]. Although many of these studies refer to the appreciation of art and painting, they offer exciting data regarding human development at stages correlated with different degrees of aesthetic sensitivity. These stages were confirmed in several research projects, such as a statistical study by Almeida-Rocha T, Peixoto F, Neves Jesus, S. [6].

The relation between text and image is crucial because “images are the words we lack” [7]. The complement between the two is a highly effective form of communication and literacy in the way of sharing what starts in the word and gets to the visual image and what starts from the visual image and arrives at the verbal expression [8].

The contribution of the children's illustrated album to children's mental health literacy is highly relevant and is explored in works by influential authors such as Maurice Sendak and

Léo Linonni, proving that it is possible to have a positive and effective impact on children through illustrated narratives [9].

A simple design and easy-to-read layout make the book accessible to children and readers of all ages [10]. On the other hand, cognitive skills develop throughout life [11]. Therefore, the choice of languages and images must be appealing, appropriate to the target audiences and easily understandable.

The role and importance of illustration in the concept of Education for Global Citizenship (EGC) should be valued, especially because children are great consumers of illustrated (books, comics) and animated (cartoon series and films) content. The specific case of comic books, with their text/image interaction, is an enabler of practical developments in its cognitive, socio-emotional, and behavioural dimensions [12].

In its Education for Global Citizenship document, UNESCO highlights that from the fascinating reading and observation of the carefully constructed and chosen illustrated narrative; persistent foundations can emerge for meaningful reflective attitudes and behaviours in children's lives so that design, illustration and literature are positive transforming elements in their lives [13].

*Yes* intends to improve literacy to fight obesity and provide well-being for all children.

## **Work Methodology**

### **The Narrative**

*Yes* is a comic brochure with the size of 230x165mm, colour printed and stapled, with sixteen pages. A bilingual and annual edition, in which the story in the first eight pages, is written in Portuguese and the last eight in English. The previous page from the cover has three opinion texts addressed to parents, written by the Director of Pediatrics Services of Pedro Hispano Hospital (HPH), Dr Cidrais Rodrigues; Dr Patricia Santos, a Pediatrician from HPH; and two professors in Physical Education and Sports, Dr Inês Aleixo (Bachelor Course Leader) and Dr Lucimer Bohn.

The reasons for the magazine being bilingual allow for a reinforcement of the message, and also, in Portugal, children since form 3 had English classes.

Students in the 3rd year of Bachelor in Physical Education and Sport at ULP were responsible for the text narrative. In the first semester of 2020/21, four groups of three students and individual students created a story about Health and Physical Condition conducted by two professors, one from Physical Education and Sport bachelor and the other from Nutrition.

### **The Illustration**

In the second semester, twenty-two students in the 3rd year of Communication Design bachelor's illustrated the narrative text selected. The illustration work was carried out for six weeks, conducted by two professors – one from Communication Design IV and the other from Illustration classes, with 54 work hours. The reduced number of students in this class allowed for more excellent monitoring and guidance of the work carried out by students.

The creative process was done through the Design Thinking methodology [14] [15] and began in the following order: *problem definition, ideation, prototype and implementation (problem-solution)*.

### ***Problem definition:***

The process began with a brief; students were asked to create individual illustrations for a comic brochure. The objectives were taken into account: the target (8-12 years old), available time (six weeks), and proposal (preventing childhood obesity, increasing levels of literacy in the context of healthy eating and physical exercise through a comic brochure). Illustrations should be age-appropriate, simple, functional, appealing, and easy to read and understand. Students also had to consider the schedule with start and end dates for each project stage. “Almost like a scientific hypothesis, the brief is a set of mental constraints that gives the project team a framework from which to begin, benchmarks by which they can measure progress, and a set of objectives to be realised (...)” [16]

When the brief was delivered and the narrative analysed, an expository class was prepared to present to the student's comic magazines and illustrations to teach specific terms applied to comics and to make them understand how comic creators combined in a few frames pictures, captions and dialogue to tell the story and convey the message. This class was also crucial because it highlighted the importance of characters, environments, and colours in children's engagement with the comic. These factors can be decisive in the way they will understand the message.

### ***Ideation and Prototype:***

This term, ideas were generated with tools such as words, images, colours and shapes through brainstorming, keywords, action verbs, a mind map and a mood board. Students presented the creative process and a set of ideas, an exercise that starts with a divergent approach to create an extensive range of options.

In this phase, students must:

- Create characters. Several quick drawings were made on the sketchbook (drawing faces and expressions, drawing bodies and dynamic poses, people in motion and clothes to distinguish characters) (Figs.1, 2 and 3);
- Drawing backgrounds and environments;
- Choose the illustration technique from analogue (sketching, inking, acrylic painting, watercolours, or other), digital (Adobe Illustrator, Adobe Photoshop, Procreate, or other) or mixed media;
- Choose the bubbles style (speech bubbles and thought bubbles);
- Choose the typography and the size (comic, fun but easy to read considering the age group);
- Choose the colour palette depending on the target and the topic. This study was based on Johannes Itten's theory of *The seven colour contrasts* that establish harmony and create dimension in design: hue, light-dark, cool-warm, complementary, simultaneous, saturation and extension. “We speak of contrast when distinct differences can be perceived between two compared effects.” [17]
- Choose the page layout and the storyboard. In this stage, students also decided which template would better fit their comic strip according to brochure dimension (230x165mm) and the number of pages (8) to organise the narrative sequence. Due to its condensed format, a comic strip must highlight only the most essential elements of its targeted topic.

Most students showed difficulties on:

**1<sup>st</sup> difficulty:** Synthesizing the information to represent only the essentials in each box. As a result, some elements were not visible due to the small-scale box.

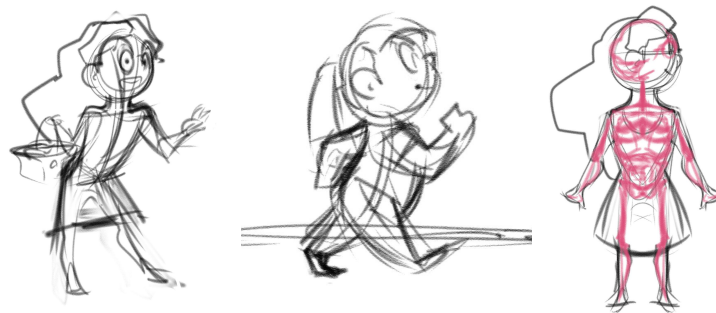
Solution: In the one-on-one sessions student and teacher discussed the student's work in progress. Students were advised to review the illustrations and summarise the visual information as little as possible. Each case was analysed with the guidance of the teacher. Sometimes drawing one element was enough instead of drawing two or three that didn't add value to the story. And since only one part is represented, it could be readjusted to have a larger scale.

**2<sup>nd</sup> difficulty:** Spreading the images across the strips and the pages.

Solution: To overcome this problem, students were advised to cut the strips into individual boxes and rearrange them appropriately. Each page must contain a maximum of 6 boxes/vignettes, and the eight pages can only have a maximum of 48 boxes. Based on this number, the text can be spread among the boxes. However, the pages must have a different number of boxes and strips to establish a rhythmic and harmonious reading.

These suggestions have allowed students to overcome their issues and difficulties effectively.

After ideas were tested, students presented the advantages and disadvantages of each solution in a convergent process. The strengths and weaknesses of each solution were analysed to get the final answer. At this stage, students printed their pages to be aware of the legibility of the text and the images.



**Figs. 1, 2 and 3.** Joel Maia's quick drawings of characters.

***Implementation (problem-solution):***

The final solution was developed, finished, and presented with all the creative processes and steps justified. Storyboarding and page layout, including the full illustration on all the boxes, strips, and pages. The complete sequence of images and text with speech bubbles and thought bubbles, the number of boxes per strip and the gaps or ellipses (space between boxes). In this term, students must have created a story sequence, and organised ideas by combining pictures, captions, dialogue, thought bubbles and speech bubbles to tell the story and enthusiastically express the message to convey the message.

The *Ideation* and *Implementation* process was always guided by the teacher in small group dialogues or individually by the one-on-one desk critique (crit), in which student and teacher discussed the student's work in progress where the student began by reporting the state of the

project and describing its development since the previous crit. Projects were analysed, and the weaknesses were discussed to find solutions to overcome them and help the student progress in the desirable direction.

### **Form assessment**

The final assessment in the Communication Design IV form and Illustration form considered the following metrics:

1. Value-Added. How does the illustration complete and enrich the text?
2. Is it attractive and engaging for children between 8 and 12?
3. Visual language and authorship – expressivity, creativity and own identity.
4. Is colour robust, bright and vibrant that attracts readers?
5. Typography – Is the font suitable for the project and the target and easy to read?

### **Jury assessment results**

The illustration assessment was carried out by six experts in the areas of Design (two teachers), Illustration (two teachers), Videogames (one teacher), Sports (one teacher), and Nutrition (one teacher), who were determined by a majority the best proposal, taking into account: the target (8-12 years old); proposal (preventing childhood obesity, increasing levels of literacy in the context of healthy eating and physical exercise through a comic brochure); illustrations should be age-appropriate, simple, functional, appealing, and easy to read and understand. Joel Maia's illustration won by a majority of votes.

It was an exercise that added value to fulfilling the objectives of the curricular units because students knew they were participating in an internal competition in which one would be chosen. For those whose text and illustration were selected, the possibility to see their work recognised, published and used by the community (Children, hospitals and schools).

### **Image preference assessment survey – methodology**

To assess the kind of visual languages that children prefer, a survey of children's preferences (8-12 years) was carried out in two Porto schools – *Flori* (lower school, form 3 and 4) and *Francisco Torrinha* (middle school, form 5 and 6). This first edition will be a model for future editions — an exercise in alterity that may reveal children's preferences.

The survey was carried out anonymously. Students just wrote their age, gender and the name of the school. Students must focus on the images, so all the text was taken from the speech bubbles. Students just had to choose which illustration they preferred from four options. The four illustrations were selected according to the following criteria: the three most voted by the jury and a fourth with a visual language entirely different from the previous ones. For this purpose, one strip from each illustration author and the same part of the narrative was selected. All text was covered in speech bubbles with the aim of children only focusing on the images. (Figs 4, 5, 6 and 7.)

Students whose illustrations were selected for the survey: Joel Maia (Figure 4); Eduarda Borges (Figure 5); Clara Tapadas (Figure 6), and Diana Ferreira (figure 7) were the other student whose illustrations were selected because she has visual language utterly different from the others.

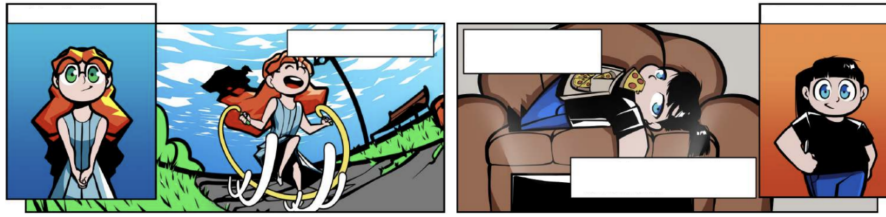


Fig. 4. Joel Maia's illustration.

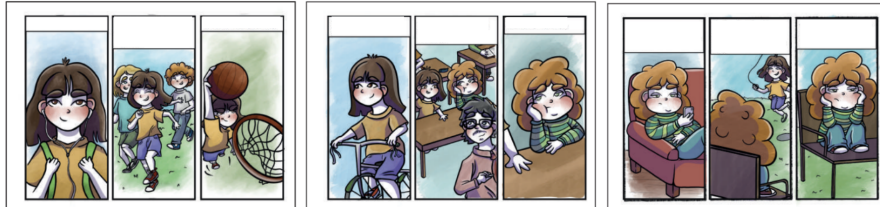


Fig. 5. Eduarda Borges's illustration.



Fig. 6. Clara Tapada's illustration.

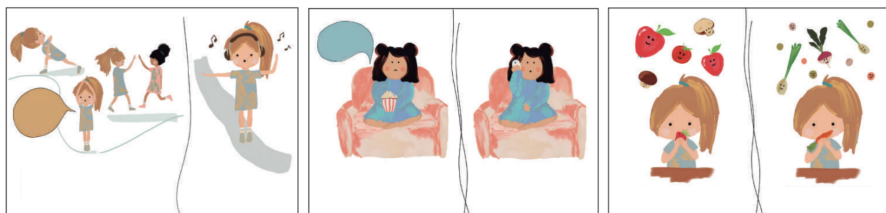


Fig. 7. Diana Ferreira's illustration.

## Results

As described before, the creative process of *Yes* 1st edition has different phases and players. The first challenge was the message (story) carried out by students and guided by Physical Education and Nutrition professors. An evaluation committee of three experts in the same areas, Physical Education and Nutrition (E), selected the best proposal – *A healthy life, a better life!* From Isabel Izquierdo Rufino, an Erasmus student. This narrative tells the story of two children of the same age who study at the same school but with different eating and exercise habits. Ana eats healthy foods and practices physical exercise – playing ball, jumping rope, and walking or cycling to school. Laura usually eats fast food, soft drinks, and ice cream, and she doesn't like to exercise and spends many hours on her smartphone and watching TV. But one day, the two girls met at the supermarket, and their organs spoke to each other. From that moment, Laura became aware of the importance of healthy eating and regular physical exercise and changed her lifestyle. A fun and educational story to advise the dangers of a sedentary lifestyle and healthy eating. Based on the criteria described before, from the Communication Design IV and Illustration classes, from 22 students' work, seven were selected to be submitted to an evaluation panel. Following those criteria, the chosen

workgroup aligns with our target group's literature recommendations. This second stage group prefers the realism of the forms and the theme's relevance (5).

As a multidisciplinary project, the final decision was delivered to six experts in Design, Illustration, Sports, and Nutrition. Each expert selected the three most suitable illustrations and classified them with a 3 points scale: three for the first and 1 for the last. The three illustrations with more points were from Joel Maia (Figure 1) with 12 points, Clara Tapadas (Figure 2) with 10 points and Eduarda Borges (Figure 3) with 9 points.

**Table 1.** Expert review results

<b>Illustration author</b>	<b>E1</b>	<b>E2</b>	<b>E3</b>	<b>E4</b>	<b>E5</b>	<b>E6</b>	<b>Total</b>
Clara Tapadas	3	3	1		2	1	<b>10</b>
Eduarda Borges	1		3	2		3	<b>9</b>
Diana Ferreira				1			<b>1</b>
Joel Maia	2		2	3	3	2	<b>12</b>
Nicole Hermida		2					<b>2</b>
Fernando Barbosa					1		<b>1</b>
Sofia Almeida		1					<b>1</b>

Joel Maia's work (Figure 4) was selected from five experts and was always evaluated with 3 or 2 points.

Clara Tapada's (Figure 6) work was also selected by five of the six experts and has been evaluated with a maximum rate (3 points) by two of them.

Only four experts selected Eduarda Borges's (Figure 5) work and evaluated her with 3 points. Aware that our target should perform the final validation, we decided to validate our illustration's selection by developing a survey based on children's preferences.

Of 181 children (8-12 years old), the preferred illustration from Joel Maia, the one chosen by 50 children, coincides with the expert panel's decision.

However, and because we know that there is a considerable evolution and consequently a change in personal preferences at these ages, we looked at the results of 103 children from the last two years of Elementary School, from 8 to 10 years old and the first two years of Middle School, from 10 to 12 years old. In the first group, 78 children (8 to 10 years old), 25 preferred Diana Ferreira's illustration, and children from 10 to 12 preferred Clara Tapadas and Joel Maia's illustrations, with 32 selections from 103 (Table 1).



**Table 2.** Several illustration selections by age and gender

Author	8 to10 years-old			10 to12 years-old			TOTAL
	F	M	Total	F	M	Total	
Clara Tapadas	6	7	<b>13</b>	18	14	<b>32</b>	<b>45</b>
Diana Ferreira	21	4	<b>25</b>	12	8	<b>20</b>	<b>45</b>
Eduarda Borges	8	14	<b>22</b>	7	12	<b>19</b>	<b>41</b>
Joel Maia	9	9	<b>18</b>	16	16	<b>32</b>	<b>50</b>
			<b>78</b>			<b>103</b>	

We also verified a significant difference in the female and male gender, mainly in children between 8 and 10 years old and in the most voted drawing (Diana Ferreira) (Table 2). Out of a total of 25, 21 were girls. Interestingly, this same illustration is also the most significant difference in the 10 to 12 age group, but it is not so expressive. The illustration in which there is no disparity in gender in any age group is also the most voted and coincides with the selection of the panel of experts – Joel Maia's illustration. We can find in this illustration expressive and fun characters with solid colours and a unique style that completes and enriches the text.

## Conclusions

The methods applied up to this stage were designed to:

- i. Develop rapprochement with the target audience by applying design thinking in the creative process;
- ii. increase children's literacy concerning childhood obesity with a narrative developed, guided, and selected by students, teachers, and experts in Nutrition and Physical Education;
- iii. create an appealing illustration that motivates and stimulates reading to develop a reflective and transformative behaviour in a child's life.

Since the inconsistency in personal preference (reference) is known, we aim to create an ecosystem of communication and interaction with children to educate them about the importance of healthy eating and physical exercise. Therefore, we decided to verify our selection with children by asking their preference between four selected illustrations. As a result, our first selection aligned with the children's preferences from 8-12. Following Sandi's (10) orientation that a simple design and an easy-to-read layout make the book accessible to children and readers of all ages, we produced a few units of the *Yes* brochure.

*Yes*, it will be disseminated to schools and childhood obesity appointments in children's hospital at HPH and will be the next stage of this project: evaluate the impact of the message on children.

We believe this methodology developed a valuable resource for children, educators, and doctors — growing awareness of the designer’s role as a social agent of change. *Yes*, intend to improve literacy to fight obesity and provide well-being for all children.

Also, Design students took an immersive design-driven project that focused on a specific social problem and applied the methods, tools, and frameworks learned in the curriculum.

These pedagogical approaches also added value for students, resulting in a compelling opportunity to work on a real-life project. It also allowed the selected storyline and illustration authors to see their work recognised, published and used by the community.

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