

## Hortalândia: a healthy eating game

Cleverson de Lima Puche<sup>1</sup> Filipe Barbosa Nunes<sup>1</sup> Aufran Macêdo, Ph.D<sup>1</sup>  
 Ana Elisa Madalena Rinaldi, MSc<sup>2</sup> Priscila Nunes Carvalho<sup>2</sup>  
 Pedro Frosi Rosa, Ph.D<sup>1</sup>

<sup>1</sup>School of Computing <sup>2</sup>School of Medicine  
 Federal University of Uberlândia (UFU) – MG, Brasil



Figure 1: Hortalândia main menu

### Abstract

We created the project "Hortalândia Game" with the goal of introducing and teaching, through a playful game, healthy eating habits to children aged eight years old. The game can help the kids to prevent from becoming obese people with compromised health in the future. This project was only possible due to the cooperation between students and professors from different areas of knowledge: computer, nutrition, education and music. This work aims to show how this integration happened and to present the final result: a complete and funny educational game.

**Keywords:** Hortalândia, *eHealth*, educational game, nutritional game, playful teaching, Java game, *Processing*.

#### Authors' contact:

cleverson@comp.ufu.br  
 filipe@comp.ufu.br  
 aufran@facom.ufu.br  
 anaelisarinaldi@gmail.com  
 priscilacarval@nutri.ufu.br  
 frosi@facom.ufu.br

### 1. Introduction

Children born in the twenty-first century live with the most advanced technologies that are everywhere, in other words, these children are placed in a predominantly digital context. The information technology, integrated in almost all areas, has become part of social relations, research, learning and recreational activities.

The child games, as well as various forms of technology have undergone changes over the years. Many of these plays have been replaced by digital games, used in large scale by children and adults. The definition of digital games comprises a broad and generic name for all the apparatus that composes the structures of a digital computer for production, development, processing and playing games with sounds and images displayed on any monitor available to this purpose [Gallo, 2007]. The development of digital games is recent (a few decades ago) and almost simultaneous with the development of the personal computer technology [Arruda, 2009].

Therefore, video games and computers become a new context of culture, influencing the ways of learning. The difficulty in the games and obstacles allows the players to live better in groups and help other's in their difficulties. Even more, facing challenges that involve patience and concentration makes the game a good source of learning based on the deal with mistakes [Martins, 2011]. The use of digital technology to promote healthy habits (diet and physical activity), as known as "eHealth", is already a reality and allows individualized interventions focusing on knowledge transmission and change of behavior [Atkinson et al., 2004; Kroeze et al., 2006]. This definition (eHealth) comprises several types of tools, such as: websites, computer programs, interactive multimedia, programs on CD-ROM, email, instant messaging via cell phone and digital games [Norman et al, 2007].

So, is possible realize that the global scenario is changing. The nutritional status of the population

changed in the last three decades. The number of overweight people is increasing [Mendonça and Anjos, 2004] and in children and adolescents the scenario is not different. One of the explanations for this increase is the unhealthy food intake. Based in this fact, we asked ourselves about an effective way to provide fun and knowledge about healthy eating through alternative media present on the daily life of children. The creation of pedagogical games can bring educational benefits that can enhance learning and improve the creative sense. Following this discussion, we designed the game "Hortalândia" about healthy eating habits by stimulating the intake of fruits and vegetables and to decrease the intake of foods with high amount of fat and sugar. Our initial concern was to design an atmosphere that would provide fun and at the same time generate knowledge about the theme, leading to the practice of a healthy life. Along the development of Hortalândia, visuals and audio effects have been specially created to ensure to the kids (players) a full immersion in the context of healthy eating.

## 2. Related Works

The educational games involving nutritional aspects found in our researches have different approaches and levels of details, most of them are directed to specific points, such as foods groups with same nutrients and memorizing pictures of fruits and vegetables. One of the games, called "Game of Food" [TVCultura, 2012] consists in separating fruits, desserts, meats and vegetables among four shelves of a refrigerator. If the player misses the correct shelf when dragging a food, he/she hears a sound of error, and then tries again until all items are positioned correctly. Another game is called "Food Wheel" [NJogos, 2012], in which the player drags the name of some foods placed on the left side to their correspondent picture on the right. These pictures are placed in a wheel, which is the name of the game. Once the player finishes the dragging of the food names, the game shows the number and percentage of correct answers.

As far as we know, Hortalândia presents several new aspects in comparison to other nutritional education games. For the start, the game innovates in how the concepts about food and healthy diet are presented and how the children are able to learn them. It is based on a story whose plot is followed by an avatar, chosen by the child. The game follows the gameplay style of Mario Bros [Nintendo 1985], making the game easily assimilated and can be played in an intuitive environment by the children. The concepts of nutrition elements are presented through educational challenges, such as questions, dragging elements, skipping villains. Other challenges require recognition of before presented food, which promotes amplification of their knowledge in recognition. Even more, some are of dexterity that instigates reflection and reasoning of the child, and others instigate the

ability of avoiding unhealthy food (e.g. ones with high amount of fat, sugar and salt). When the player is unsuccessful in this kind of challenge he fattens, which makes it less agile to future challenges. This lack of agility can lead him to a gym to recover his ideal physical form, meaning then that the game also presents to the players the need of combining healthy eating with physical activity.

In general, the main ideal of this project is to present healthy eating habits in a playful approach, seen from the perspective of the diversity of intelligence - multiple intelligences [Gardner, 1995]. We expect to build a humanistic and cognitive formation, so that each player is able to learn that a healthy diet can bring several benefits [Nascimento et al 2011].

## 3. Methods

The methods used for the development of the project "Hortalândia" was based on the fragmentation of large tasks using the PDCA cycle (Plan, Do, Check, Act) [Deming, 2000]. The cycle consists of four steps:

- **Plan:** Planning. In this step we identified the main bad eating habits of our target (schoolchildren) and selected themes for the developing an execution plan for the project;
- **Do:** Execution. We carried out the execution plan of the project by creating the arts and coding the game.
- **Check:** Checking. We conduct weekly meetings to evaluate the activities that had been completed;
- **Act:** Action. Depending of the result of the Check meeting we corrected the mistakes or improve the code.

The option of fragmenting the tasks was given by the need to analyze each element that composes the game under the perspectives of multiple cognitive developments, the pedagogical applicability and the potential of entertainment [Nascimento et al 2011].

Evaluated these needs, two members of the Nutrition course (a student and her teacher advisor) sought the members of Computer Science course and exposed their ideas: developing an educational children's game which children aged eight years old could acquire enough knowledge to bring healthy eating habits for their daily diet. We rode up then, a development team for the project design.

Subsequently, there was a need to develop the game following some pedagogical guidelines and, later, the need to incorporate a soundtrack with the game. Thus, we got in touch with the College of Education and the Institute of Music in our university, which became part of the developer team.

The team worked in several of aforementioned steps, according to the expertise of each of its members. Nevertheless some sorts of task were specific to some ones according to their specialties:

- School of Computing: coding the game. However, due to the design skill of two members, the art design was also the responsibility of this part of the team;
- School of Medicine (Nutrition Course): writing the game plot, and providing specific information about foods, healthy eating and the game application;
- School of Education: supervising the pedagogical part, evaluating and adapting the game plot to children's cognitive development;
- Institute of Arts (Music Course): creating and recording the game soundtrack and the game sound effects.

To build the software we used the Java programming language [Walsh and Fronckowiak, 1998], the NetBeans development environment and libraries of the Processing programming language [Reas and Fry, 2010].

### 3.1 Hortalândia development process

In the very beginning of the project weekly meetings were held with the whole team so that new ideas were presented, discussed, evaluated and scheduled for implementation as well as implementations already made were also evaluated. The script of the game, developed by members of the School of Medicine and School of Education, was transcribed in form known as Game Overview Document (G.O.D.) and Game Design Document (G.D.D.).

We designed, at first, a game with five phases. Later, due to the need to perform a schedule previously established, we reduced the number of phases to three, each one of these divided into scenes. A scene consists of a small goal to be achieved by the player, so the phase ends when all goals are achieved and a villain (boss) is defeated in the last scene.

When we were to start the development of the second phase, we realized that the elaboration team felt very difficulties to fill in all fields of G.O.D. and G.D.D., beyond that, often, the information described was not well understood by the implementation team (members of Computer Science course and members of Music course). Then we come to the conclusion that the development of "Hortalândia" was not progressing as we expected when we decided to adopt the G.O.D. and G.D.D. forms for documentation and that, if we insisted on using such forms, project completion schedule would not obey the chronogram.

This was the big critical point in the development of "Hortalândia": forms that were ready, and were even

used by big companies in the gaming market, did not satisfy our needs, or presented themselves inefficiently. At present, the implementation team did a pause in their activities and focused on preparing a document that would facilitate the work of both teams, without neglecting the primary role of the same: to document.

It was designed so a new form template, which we call "Hortalândia's Form" and was structured as follows: introduced to an overview of phase respecting the limit of one page and then gave up start the description of scenes individually, one at a time, this time without page limits, as shown in the figures two and three.

**Título da Fase**

**Objetivo da Fase:** Descrever o objetivo da fase em, no máximo, uma página. Essa descrição serve para que se tenha uma visão ampla sobre o que o jogador enfrentará durante a fase e, de uma forma geral, especificar qual será o conhecimento ou aprendizado adquirido nessa fase.

*O documento deve seguir a seguinte formatação:*

- 1 – Fonte Arial.
- 2 – Título da fase com tamanho 16 e em negrito.
- 3 – Objetivo da fase com tamanho 10.
- 4 – Espaçamento entre linhas com tamanho 1,15.
- 5 – Subtítulos (como "Objetivo da Fase", "Detalhamento" e "Descrição da Cena") tamanho 10 e em negrito.

Figure 2: The first page of "Hortalândia's Form"

**Especificação das Cenas**

**Cena <n>:** Cada cena deve ser descrita com riqueza de detalhes, sendo cada cena um conjunto de objetivos em comum.

**Detalhamento:** Descrever quais são os elementos, e quais são os movimentos de cada um deles (por exemplo, o pastel é um soldado e este anda pela cena).

**Descrição da cena:** Descrever a dinâmica da cena em si, ou seja, escrever o roteiro da cena (como o personagem irá interagir com os elementos), dividindo-a em objetivos conforme segue o exemplo:

1. O personagem deve conversar com o mago a fim de obter instruções sobre o que deve fazer na fase. Em seguida, deve entrar no sacolão.
2. O personagem deve coletar todas as frutas e hortaliças espalhadas pelo sacolão. Dentro deste deve haver um cenário de destruição, com uma caixa registradora, frutas podres e hortaliças estragadas pelo caminho.

Figure 3: Hortalândia's form orientations for scene specifications

Thus, we implemented the "Hortalândia's Form" into the development of the game, achieving a significant improvement in communication between both teams as the speed of project execution.

#### 4. The Zeca and Carol adventures in the Hortalândia world

"Hortalândia" is compound by three phases and gives the player a novel nutritional experience, full of adventures and dangers. Initially, the player must choose its avatar between two possibilities: Zeca (a boy) or Carol (a girl). The Figure 4 presents these two characters.



Figure 4: The screen where the player chooses an avatar

After choosing the character, the game's story is presented to the player through figures, dialogue and sounds. The story begins when Hortalândia was a kingdom, ruled by King Joachim I. The place was known for its exceptional level of life quality of their citizens. They were used to live in happiness due to the lack of illness especially because of the consumption of vegetables and fruits of good quality, grown in the kingdom garden. The vegetables and fruits were sown with magic seeds from a mystic amulet, which was created by an old wizard named Semilla and entrusted to the king of Hortalândia. Many years have passed. Hortalândia is no more a kingdom but a city. The amulet is now in the hands of a nice and humble gentleman called Mr. Vincent, a descendant of King Joachim I. He and his family cultivate fruit and vegetables, these products were sold to a grocery called VidaBoa, which was also owned by the Mr. Vincent family.

The citizens of Hortalândia lived in a healthy way and rarely had diseases because of the good quality of vegetables and fruits from VidaBoa grocery. However, there was a group in the city that enjoyed foods with high amount of fat, sugar or salt. This group was known as "Detestable" and constitutes the villains of the game. The Figure 5 presents these bad guys. From left to right, they are: Gordurosa, a fried potato package; Puro Sal, a package of salty snack; Gasoso, a bottle of soft drink; Açucarada, a cookie; and Adiposo, a cup of ice cream. This gang is completed by some "soldiers" like pie, fried foods and cakes. Nowadays, these kinds of food represent the most consumed food by children, those foods have high amount of sugar and salt what can cause obesity and other non-communicable chronic diseases such as hypertension, diabetes and dyslipidemia.



Figure 5: The five detestable – the bad guys of the game

Back to the game plot, the sales success of the VidaBoa grocery raised the fury of the five detestable. The financial income of their supermarket, known as Guloso, was very bad. Then the gang decided to put an end in Mr. Vincent's grocery to attract people to their own supermarket. They created a plan to destroy the source of healthy food: they would steal the magic amulet from Mr. Vincent and destroyed the VidaBoa grocery, therefore there would be neither healthy food available in town nor magic seeds to sow new vegetables and fruits. And so the gang did. Being the VidaBoa grocery out of business and with no other place where people could buy food, the Guloso supermarket prospered.

The main type of food that was sold in this supermarket was food with high in fat, sugar and salt. So, the citizens started getting and obese and ill due to the elevated amount of fat and sugar and the lack of vitamins and minerals. So, Zeca and Carol (Mr. Vincent's kids) decided to strike back and get the magic seeds back and rebuild the VidaBoa grocery. Figure 6 presents Zeca collecting some fruits after the destruction of VidaBoa grocery.



Figure 6: Zeca collecting some fruits

Along the game, the player will find the "soldiers" of the five detestable, which are salty pies and quiches and small candies. Figure 7 presents Carol facing one of the soldiers. If the player touches one of the soldiers he/she gets fat as if he/she had eaten the soldier. Figure 9 presents how Zeca and Carol are presented in the game after they got fat. Look at their bellies. As soon as the player gets fat he/she loses speed and agility and eventually he/she needs to go to the gym. The player stood in the gym until he/she answers correctly questions about nutritional information about fruits and vegetables. Once the player leaves the gym, he/she returns to his/her normal weight and gets back to the

game phase he/she was before going to the gym. The game dangers and the consequences of player actions are explained by Semilla, the wizard. Also, there is an icon all long the game where the player can access instructions and tips on how to use game controls.



Figure 7: Carol defeating a soldier

At the end of each phase, the player will face one of the detestable. The detestable are bigger than the soldiers and more difficult to defeat. Figure 8 presents Zeca facing Açucarada and Gasoso at the end of phase 3. Defeating a detestable means you will have access to a piece of the map that shows where the magic seeds are hidden. One important point of the game, especially in terms of pedagogical issues, is that no enemy is killed. Killing the detestable would mean that we should not eat the foods represented by these “bad guys”. But in real life, it is difficult to a child even to an adult to definitely stop eating one of these detestable. So, unless we have medical recommendations against these kind of foods, we can eat them but in a moderate way, in small servings and above all we must learn to eat more fruits and vegetables than processed foods. That is the message we want to give to the children.



Figure 8: Zeca fighting against Açucarada and Gasoso

#### 4.1 Phases of the Game

At each phase of the game new challenges and different obstacles are presented to stimulate the player wits and his/her memorization skills. Phase one takes place in the almost completely destroyed VidaBoa grocery. In this phase the player faces Puro Sal. The focus is to teach the player the conceptual difference between fruits and vegetables, as well as provide information about them. The cognition about this kind of food is reached by collecting fruits and vegetables that were left behind after the destruction of VidaBoa

grocery. The player must collect the fruits and vegetables along the path and classify them properly according to the correspondent shelf. Phase Two occurs in the Guloso supermarket. The place is dirt and dark, and the great majority of the selling foods with high amount of fat, sugar and salt. The focus on this phase is to teach the difference among several vegetables. Finally, Phase Three occurs in the savanna open land. The focus of this phase is about the nutrients of foods. The player must prepare a balanced meal with the most important nutrients from rice, bean, meat and vegetables. In addition, the player must prepare a salad and a vegetarian sandwich using some available health ingredients.

The player advances from one phase to another by defeating one detestable and correctly answering multiple choice questions about nutritional concepts that were presented in the correspondent phase. In the gym, the questions presented are different in each phase, making sure that the player learn (in the worst case, by memorizing) the concepts presented each time he goes to the gym. At the final of each phase, after defeating the detestable, the player recovers a piece of the map (used by the detestable to increase their sales). It is estimated that the average duration of the whole game will be at most 30 minutes.

The game has a happy end after all, even to the detestable ones. If the player succeeds winning the phase three, he/she will recover the mystic amulet and the magic seeds, such that the garden can be restored. The mart VidaBoa is rebuilt. And the detestable ones learn the importance of good eating habits and this knowledge transforms them into a more healthy entities. Gasoso becomes an orange juice; Açucarada becomes a low sugar wafer; Adiposo becomes a *sorbet* (ice cream made with fruits and low-fat percentage); Puro Sal becomes low salt cookie; and Gordurosa becomes a baked potato.

#### 4.2 Nutritional Approach

The school environment has proven to be a suitable scenario for the development of activities aimed at promoting healthy eating, because it is the place where children stay most part of the day and explicit their eating habits [Gaglianone et al., 2006]. Following this idea, the government law the “Portaria Interministerial 1010” [DOU 5.9.2006] sets as priorities the actions for nutrition education: development of gardens to stimulate the consumption of fruits and vegetables, hygiene and handling of food; restriction of selling food with high level of fat, sugar and salt at schools. Health education includes nutritional education that is defined as well considered strategies to increase the appreciation of food and culture aspects which would be able to make believe the need of respect and the change in beliefs in general characteristics of the food. This is meant for the impact economically and socially for an adequate quantity and quality aimed for the health, pleasure and social interaction [Boog, 2004]. In

the policies and contemporary health some programs are appreciate and encourage the empowerment, in other words, capacity and strengthening of individuals and communities to achieve their goals [Hamm et al, 2003]. Therefore, the promotion of a healthy diet in childhood through different methods and materials of nutritional educations aims to develop greater interest in healthy attitudes about food, using the presentation of news and planning engaging activities that require creative ability, sensitivity, vivacity, monitoring and evaluation [Mello et al. 2002].

The intake of fruits and vegetables is low in adults and children. Generally unpalatable foods such as vegetables are offered to children in a negative context by parents or guardians making it difficult to become these foods attractive [Ramos, Stein, 2000]. So, it is expected with the implementation of this game, that children learn how to identify fruit and vegetables, the recommended daily intake of their main nutrients and that they feel motivated to reduce the intake of candies and another sugary foods. In addition, it is expected that these children serve as a vehicle to change eating habits of their own families.

#### 4.3 Visual Aspects of the Characters and Foods

To help in immersing the target group in the game, we decided to create characters with the appearance of them: children aged eight years old. In addition, gain of weight in the characters, which occur when a players strikes in the "band" making reference to eat it, making the movements of the characters slower and changes in the appearance as seen in Figure 9.

There are two levels of change, the first occurs when the character collides for the first time, and can still keep moving. The second change comes from the state just like before to go to the gym, where the character is unable to move.

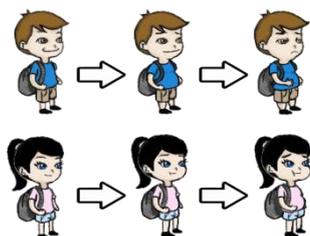


Figure 9: Characters with different appearances after eating a member of "band"

The construction of the characters, before being finalized, went through a prototype phase, in which drafts were presented. The aim was to show the members of the project the initial idea of the characters and what would be the appearance of them in movement. This served to through the various reviews; the drawings could be developed to please the

perspectives in general. The change of the layout of the character of the prototype to the final version of the game can be seen in Figure 10.

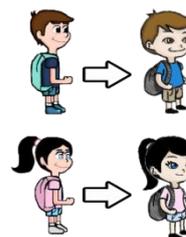


Figure 10: Drawings of the characters in the prototype (left) and in the official game (right)

In order to the formulation of the characters the use of sketches was important so that the whole art of the game could be formulated. This technique is the use of drafts as abstractions of what is being developed without the details of a finished product, are also called outlines. At the level of creation, it becomes easier to abstract the idea of the character when the drawing can be quickly modified, until you get the consolidation of the details, colors, and then the final design.

Using sketches is not simply take the thoughts onto paper, it means the improvement of techniques and the ability to better translate the ideas into drawings [Lippincott, 2007]. Therefore, the game's characters were created using this technique for the structure formation of character and were later added details to the finalization of the character, bringing its appearance similar to the target audience. In the creation of characters in several different jobs, it is common to use sketches; it shows the various attempts of the artist, clearly showing the evolution to the final design.

Another technique used in the project was to use the storyboard to portray the stories presented at the beginning and end of the game. This is the elaboration of the narrative history of the game from several drawings not finalized in order to abstract the general details of the script, so this is understood in an illustrated way.

The storyboard is used in several works such as films or conventional animation, games, book illustrations. This technique allows changes in the structure of the project to be made before the finalization of the drawings, ensuring the effectiveness of productivity without spending time remaking drawings finalized, requiring more time for its completion.

Through the process of creation of the characters from the techniques used, it is expected that the child feel familiar with the characters enough to imagine themselves in their own adventure. The immersion of

the character is important to the concepts can be passed effectively.

About the visual aspect of the food, based on the optics of children are more likely to choose food with strong colors and interesting shapes [Foundation Acta Pædiatrica magazine, 2012], the nutritional elements in the game were carefully colored and designed to guarantee the immersion of the player in the game.

The other drawings were based on the script of the game and details were added to make sure that the child would feel true about the context.



Figure 11: Scene that illustrates the vivacity of the colors of foods

## 5. Final Remarks

Hortalândia is an educational game towards schoolchildren focusing healthy eating habits. It is the result of the effort of people from many different areas of knowledge, such as Nutrition, Computing, Music and Pedagogy. By the time we are writing this line, the game is going to be applied to children from public schools of our region so that we can find out the effectiveness of our game and how good or bad is the knowledge of our children about good eating habits. The game was developed using Java and Processing programming languages.

The game focuses especially on fruits and vegetables because these kinds of foods have low acceptance by child. The food with high amount of sugar, fat and salt are also highlighted for having high acceptability among In other direction, it is important to highlight that the game elements are entirely novel from the sound track and sound effects through sketches, scenarios and character designs.

## Acknowledges

Our thanks to Danilo Bizinotto Borges for their collaboration in some drawings, to Danilo Aguiar for the sound track and sound effects, Raphael Pimenta for his contribution in part of the game code and Eucídio Arruda for his pedagogical contribution. Cleverson de Lima Puche thanks CAPES/MEC for the scholarship granted by the Programa de Educação

Tutorial – PET and Priscila Nunes Carvalho also thanks FAPEMIG for the scholarship.

## References

GALLO, S.T. *Jogo como elemento da cultura: aspectos contemporâneos e as modificações na experiência de jogar*. São Paulo: Programa de Pós-Graduação em Comunicação e Semiótica da Puc-SP, 2007 [Tese de Doutorado]

ARRUDA, E.P. *Jogos digitais e aprendizagem: o jogo Age of Empires III desenvolve idéias e raciocínios históricos de jovens jogadores?* <Tese Doutorado>. Faculdade de Educação, Universidade Federal de Minas Gerais (FaE-UFG), 2009. 238p.

MARTINS, D. 2011. O lúdico e sua importância como recurso pedagógico.

ATKINSON NL, GOLD RS. The promise and challenge of eHealth interventions. *Am. J. of Health Behavior*, v.26, p. 494–503, 2002.

KROEZE, W. et al. A Systematic Review of Randomized Trials on the Effectiveness of Computer-Tailored Education on Physical Activity and Dietary Behaviors. *Ann. Behav. Med.*, v.31, p.205-23, 2006.

NORMAN, G.J. et al. A Review of eHealth Interventions for Physical Activity and Dietary Behavior Change. *Am. J. Prev. Med.* v.33, p.336–345, 2007.

MENDONÇA, C.P.; ANJOS, L.A. Dietary and physical activity factors as determinants of the increase in overweight/obesity in Brazil. Rio de Janeiro, 2004.

NINTENDO. Super Mário Bros. Disponível em: [http://www.nintendo.com/games/detail/FMY4BpdAjS335VKT5tgj2\\_cLBPxOKbak](http://www.nintendo.com/games/detail/FMY4BpdAjS335VKT5tgj2_cLBPxOKbak), acessado em 17/07/2012.

GARDNER, H. 1995. *Inteligências Múltiplas: A Teoria Na Prática*. São Paulo: Artmed.

NASCIMENTO, L.; PIRES, V.; FONSECA, T.; TONÉIS, C. Desenvolvimento do game educativo “De Amarna a Tebas – Um jogo de estratégia no Egito Antigo” – SBGames 2011.

DEMING, W. E. 2000. *Out of the Crisis*. Cambridge: MIT Press.

WALSH, A. E.; FRONCKOWIAK, J.; “*Java Bible*”, John Wiley & Sons Inc, 1998.

REAS, C.; FRY, B., 2010. “*Getting Staerted with Processing*”, O’Reilly Media, Inc.

GAGLIANONE, C. P. et al. Nutrition education in public elementary schools of São Paulo, Brazil: the Reducing Risks of Illness and Death in Adulthood project. *Rev. Nutr.*, v.19, p.309-320,2006.

BRASIL. **Portaria Interministerial nº1.010, de 8 de maio de 2006**. Institui as diretrizes para a Promoção da Alimentação Saudável nas Escolas de educação infantil, fundamental e nível médio das redes públicas e privadas, em âmbito nacional.

BOOG, M.C.F. Contribuições da educação nutricional à construção da Segurança Alimentar. *Saúde Rev. Piracicaba*, v.6, p. 17-23, 2004.

HAMM, M.W; BELLOWS, A.C. Community food security and nutrition educators. *J. Nutr. Educ. Behav.*, v.35, p.37-43, 2003.

MELLO, E. D.; LUFT, V.C.; MEYER,F. Atendimento ambulatorial individualizado versus programa de educação em grupo: qual oferece mais mudança de hábitos alimentares e de atividade física em crianças obesas? *J. Pediatria*, v.80, p.468-474,2004.

RAMOS, M.; STEIN, L.M. Development children' s eating behavior *J. Pediatric.*, v.76, supply 3, p. S229-37, 2000.

LIPPINCOTT, G., 2007. *“The Fantasy Illustrator’s technique book”*. London: Barron’s.

Foundation Acta Pædiatrica Magazine. Volume 101, Ed. 1. January, 2012.