Serious Games to Teach Nutrition Education to Children Between 9 to 12 Years Old. Pickit! and Cookit!

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Abstract. The current trend of increase in children obesity is worrying governments around the world and urgent actions are requested. The promotion of Nutrition Education in early stages has shown to be a factor to prevent the gain of weight in children. A tool that is gaining popularity in teaching contents to children are the Serious Games. The objective of this paper is to describe two Serious Games, Pickit! and Cookit! that has as objective to teach Nutrition Education to children between 9 to 12 years old. These games form part of the Modifying Eating and Attitudes through Learning platform, a pedagogical tool created for nutritionists and primary school teachers to transfer nutritional knowledge to children. These games contain relevant elements in the design of Serious Games as are avatars, levels and a system of points. It is expected that trough these games the children will increase their nutritional education knowledge.

Keywords: Nutritional education · Serious game · ICT platform · Children

1 Introduction

A healthy and balanced nutrition is important for the development of children. However, there is a current tendency of infants to eat in an unhealthy way, and to have a sedentary life, and this bring important health problems as obesity [1]. Currently, overweight and

obesity affects millions of children around the world; according to the World Health Organization (WHO) in 2013 there were around 42 million with overweight or obesity [2].

Several attempts have been done in order to reduce or prevent this tendency. One of the most important is promoting Nutrition Education (NE) in children population [3]. NE is defined as "any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food and nutrition- related behaviors conducive to health and well-being; NE is delivered through multiple venues and involves activities at the individual, community, and policy levels" (3, p 176-177). Also, it has been identified that the most recommended context to implement NE to children is through interventions in primary schools [4].

Regarding school-based interventions, Serious Games (SG´s) are one of the most innovative tools that have been designed to provide educational contents to children. Although there are several definitions of SG's, most researchers and developers agree that they are games used for purposes other than main entertainment, they inherit some of the game play characteristics from entertainment games and have focused on a principal goal as could be training or learning, with the objective of applying the learnt lessons in real-life work environments [5].

The MEAL (Modifying Eating and Attitudes through Learning) platform has been designed to implement a NE training for teachers and nutritionists in order to learn how to teach NE to children [6]. This platform is part of the MEAL project, an European Project funded under the Lifelong Learning Program (Project number: 543535-LLP-1-2013-1-ES-KA3-KA3MP). The platform contains two SG's, used as complementary tools to help the professionals to reinforce the lessons taught. The objective of this paper is to describe the SG's included in the platform MEAL, as long with their components, objectives, different levels and main characteristics.

2   Serious Games in MEAL Platform

The two SG's contained in the MEAL platform are: Pickit! and Cookit! They have been developed according to the characteristics of children on the range of age of 9 to 12 years old, and they contain basic elements that are considered relevant as a system of points, a ranking, and different levels of difficulty [7]. Also at the moment of designing these SG´s there were considered the main characteristics that according to the scientific literature should have the SG´s to motivate and excite the player, and therefore are perceived as acceptable and fun by those players. Among those characteristics we can find that the SG´s should has a clear system of competition with other players or the game itself, and goals to achieve inside the game, a clear system of rules of what is allowed and not to do inside the game, the option to perform choices, as could be to select or not an aliment, and establishment of challenges in order to overcome and make more fun the game [8], among others.

2.1 Pickit!

The first game that the children play as part of the MEAL program, is Pickit! http://www.mealproject.eu/ the game has been translated to 5 languages (English, Spanish, German, Norwegian, and Italian). This SG is aimed to teach to the children the composition of foods and their classification according to the food pyramid, as are whole grains, fruits and vegetables, milk and dairy products, fish, meat, oil, and sugared aliments (see Fig. 1). Pickit! includes a system of points where the child is rewarded when he/she performs a task requested by the game, and the player loose points when he/she does an action that is not requested. Also, this game was designed with a mechanism to use the time that the player takes to finish the game into adding or reducing points, meaning this that if the player finished the game in a short amount of time will be rewarded with extra points, and if the player takes a long period of time then he/she will lose points.

Fig. 1. Main screen with the instructions provided to the player in the SG Pickit!

Fig. 2. Example of junk food in the second level of Pickit!

At the beginning the player is requested to choose a character. There are two avatars available (boy and girl). In this SG the child controls a shopping cart and has the instruction of only selecting the aliments that are requested. For example, to pick only fruits or vegetables, and in this case if the child picks an aliment different the system reduces points and shows a message of error. Also as part of this game the child has to avoid picking junk food that appears in the game (see Fig. 2). Pickit! has 3 different levels, and provides a summary of the points achieved when the player finishes. In the first level the player is requested to pick only aliments that contain carbohydrates and vegetables. In the second level the instruction is to select only aliments that are fruits and dairy. In the third level the player is requested to pick only aliments with meat proteins. When the children finishes the game, the system provides a total score of the points gained and the total time that the player lasted to finish the 3 levels.

2.2 Cookit!

The second game included in the MEAL platform has the objective to teach to the players about the percentages of energy/calories, healthy and unhealthy levels for different ingredients and foods that are usually found at any home. This game has been also translated to 5 languages. At the beginning of the game, the player is asked to select a

male or female avatar. Although during the game the player does not see an avatar as in Pickit! at the end of the game the selected character appears to provide a positive or negative feedback regarding the choices that the player made during the play (see Fig. 3).

Fig. 3. Positive feedback provided by the game Cookit!

Fig. 4. Example of the indicator displayed in the SG Cookit!

In this game the children receive as instruction to compose a breakfast, meal or dinner; then, several aliments appear, among healthy (e.g. vegetables, fruits juice, whole meal bread, etc.) and unhealthy ones (e.g. bacon, chocolate, cakes, etc.) and the children could select as much as he/she wants. The game includes 3 general indicators: (1) level of energy of each aliment, (2) percentage of healthy elements of the aliment, and (3) percentage of unhealthy components of the aliment (see Fig. 4). The system also contains a general indicator to tell the sum of the total of energy, healthy and unhealthy elements according to the aliments selected. Regardless selecting the option to compose any of the 3 meals, the children will have to select one main dish and a secondary one, along with a beverage. At the end of the gameplay, the system provides a feedback regarding the decisions made by the player. This feedback will be positive (congratulations) if the child composes a healthy breakfast, meal or dinner, and it will be negative (warning) if the child selects a small amount of food or selects mostly hyper caloric food. Also this SG provides at the end a total score of the energy, healthy and unhealthy percentage of the total of the aliments selected.

3   Conclusions

These two SGs included in the MEAL platform have the objective to help teachers and nutritionists in their task of providing relevant NE to children population. This work is currently in progress and it is expected that these two SG´s will help the professionals to provide relevant contents of nutrition to children, and since they were designed considering the characteristics of effective SG´s it is expected that they will show high levels of acceptance as a teaching tool.

Also, it is expected that through these technological tools the children will learn concepts related with NE in a faster and funnier way. SG´s have been found to be a more enjoyable method for children to learn diverse subjects than traditional methods of

learning, and also these games could help the educators to use a more flexible and less restrictive method of teaching [9].

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