Junk-Food Destroyer: Helping adolescents with Down syndrome to understand healthy eating through serious game

Paul D Hatzigiannakoglou
Department of Educational and Social Policy
School of Social Sciences, Humanities and Arts
University of Macedonia
Thessaloniki, Greece
Email: pxatzi@uom.gr

Abstract—One research study carried out in adolescents with Down syndrome (DS) indicated that they consume fewer calories, vitamins and trace elements than they ought to according to the Recommended Daily Intake. A different study pointed out that people with Down syndrome start using computers from early childhood, displaying a liking for educational software, as well as for Video Games. In an attempt to make the most of this motivating occupation, and, at the same time, implement the positive effects resulting from playing Serious Games (SG) that promote a healthy diet to non-disabled children, I designed and developed a Serious Game of First Person Shooting (FPS) type (played either with a Wii-Remote or a mouse), which intends to help behavior change of adolescents with Down syndrome, so that they would adopt a more balanced nutrition. To avoid further low-calorie intake, the game presents only the benefits resulting from healthy food and beverage consumption compared to unhealthy ones, without mentioning quantity or caloric value.

Keywords—serious games, intellectual disability, health behavior, diet, nutrition

I. INTRODUCTION

A research [1] that was carried out in a sample of 49 persons with Down syndrome (DS) in late adolescence or older ages, who lived at home with their parents or guardian, showed that 32.1% of males’ and 66.7% of females’ weight exceeds by 15% the ideal body weight; further, 25.0% of males and 42.9% of females are obese. From the same study it becomes evident that people with DS, compared to the general population, consume fewer calories and less cholesterol and saturated fat. Another research study [2] demonstrated that, besides consuming fewer calories, people with DS also take 20% lower amounts of vitamins and trace elements than the Recommended Daily Intake (RDI). Increased body weight in people with DS does not seem to be directly related to their nutrition [1, 13], but rather to the nature of the syndrome itself, a compromised fat metabolism and the way of life in general. Other authors [3, 4] suggest that children and adolescents with DS should adopt a low-fat balanced nutrition. Such a recommendation led me to create a Serious Game (SG) which would emphasize the benefits of balanced nutrition compared to junk food. The two strong motivating factors for designing my game were the scientifically recorded beneficial effect of similar games on people with Intellectual Disability (ID) [5, 31, 33], along with the fact that numerous SG were thus far developed for such individuals [6]. While designing and developing my SG, I kept in mind that although the game is educational, it has to be entertaining as well, in order to yield an efficient training [5]. That realization led me to choose a widely spread type of game (First Person Shooting, FPS), particularly if adolescents were to be involved. To enhance the fun, I gave users the option to play the game with a Wii-Remote. In case they do not own a Wii-Remote, they can play it by using a mouse, since it is common knowledge that people with DS, even at very young ages, are absolutely capable of using a mouse to play Video Games or SG on the computer [11, 12].

II. LITERATURE REVIEW

In reviewing previous data for the scope of the present paper, I examined the results of three review articles in the field of SG and health in general.

According to Wattanasoontorn [14], 108 SG have been created regarding health and health care from 2004 to 2012. This research proposed the following subcategories:

- Health Monitoring
- Detection focuses on analysis or tracing of irregular symptoms of the patient(s).
- Treatment or therapy is used to remedy a health problem
- Rehabilitation is a restoration of health and life skills after illness, such as neuropsychological rehabilitation
- Education in health/self-directed care

Because the SG I developed is classified in the subcategory Education in health/self-directed care, I filtered the conclusions...