

Fun and Healthy Every Day: using a website as an educational tool to promote health in school children

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ORIGINAL ARTICLE

ABSTRACT

A sedentary lifestyle and poor nutrition in childhood contribute to increasing levels of poor health among the population. This study aimed to develop a website as a pedagogical tool for health promotion in schoolchildren. Therefore, a total of 39 eutrophic schoolchildren were recruited (22 girls and 17 boys), from 2nd and 5th grades of elementary school (8-10yr), from both public (61.5%) and private (38.5%) schools. Children accessed the TODDS Kids (Fun and Healthy Every Day) website for 1 hour, which was built in HTML5 format on the Wix platform. The participants answered a questionnaire to assess their perception of the site and its content. It was observed that 97.4% of children said they would like to access the site again, and all of them said they would indicate the site to a friend. Scores between 9.14 and 9.56 were attributed to colours, images and information presented on the website. 92.3% and 87.2% reported they intended to be more active and to eat healthier foods after accessing the website, respectively. In conclusion, TODDS Kids website was a well-accepted tool, helping kids to raise awareness about healthier choices and could be used as a pedagogical tool for supporting child health promotion.

Keywords: Software, Health Behaviors, Child.

INTRODUCTION

Excessive energy consumption associated with low expenditure contributes to the development of overweight and obesity, which are associated with innumerable other orthopedic, neurological, gastric, endocrine and cardiovascular diseases (Center Disease Control [CDC], 2011; Mazzocante, Moraes & Campbell, 2012; World Health Organization [WHO], 2014). Public spending on the treatment of diseases associated with overweight amounts to about US\$2.1 billion per year (Brazilian Association for Studies of Obesity and Metabolic Syndrome [ABESO], 2012). Data from 2012 show that in Brazil, 34.8% and 16.6% of boys, and 32% and 11.8% of girls from 5 to 9 years old are overweight and obese, respectively (Mazzocante, Moraes, & Campbell, 2012).

Nowadays, children spend more than two hours a day being entertained on screens such as computers, mobile phones, and TVs, which in addition to stimulating a sedentary lifestyle (Page, Cooper, Griew, & Jago, 2010), also leads to the consumption of unhealthy foods

advertised by television advertisements (Mendes, 2012; Roman, 2011; Fontenelle, 2014; Nunes, 2013; Rodrigues & Fiates, 2012). However, technology can be an instrument of pedagogical support and awareness of the importance of healthy choices (Coutinho, 2007).

In this sense, we believe that access to content shown on educational websites can be an important means of information and communication technology in the teaching-learning process, significantly contributing as material to support health and education professionals. Thus, our objective was to create and evaluate the use of a website as a pedagogical support tool for health promotion in schoolchildren.

METHOD

An exploratory, quasi-experimental, cross-sectional study conducted in two stages: 1 - development of the instrument (choice of name, logo, prototype and conducting of a pilot study); and 2 - testing and data analysis.

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Participants

The sample consisted of 39 randomly selected children of both genders (22 girls and 17 boys) from 8 to 10 years old, in the 2nd to the 5th grades of the elementary school of public (61.5%) and private (38.5%) schools in the Federal District.

Table 1 shows the mean and standard deviation values of the sample characterization data. On average, the children were considered

to be eutrophic (WHO, 2007), with a good percentage of fat (Lohman, 1992), belonging to socioeconomic class B (Association of Brazilian Research Companies [ABEP], 2012), and physically to moderately active (Barros & Nahas, 2003). Only children without intellectual, visual or reading disabilities, and those whose legal guardians signed the Free and Informed Consent Form participated in the research.

Table 1
Characterization of the sample (mean \pm standard deviation) by age

Variable	8 years	9 years	10 years
Body mass (kg)	31.4 \pm 6.5	31.3 \pm 5.7	34.5 \pm 8.5
Height (m)	1.32 \pm 0.04	1.36 \pm 0.06	1.41 \pm 0.07
BMI (kg/m ²)	18.0 \pm 3.3	16.9 \pm 2.0	17.3 \pm 3.1
BF (%)	19.2 \pm 8.9	17.0 \pm 6.2	21.7 \pm 6.6
PAL (MET)	157.85 \pm 42.1	162.60 \pm 51.2	152.5 \pm 36.0
SES (points)	29.5 \pm 7.6	23.6 \pm 7.4	26.8 \pm 5.1

BMI: Body Mass Index; BF%: body fat; PAL: physical activity level; SES: socioeconomic status.

Instruments e Procedures

Body mass (Tanita UM 080W), height (Sanny®), Body Mass Index (BMI), and Body fat (BF) were measured by tricipital and subscapular skinfold measurement by a Lange adipometer (Maryland, USA) according to the methods proposed by Slaughter (1988). The physical activity level (PAL) was evaluated using the Lifestyle Questionnaire developed by Barros & Nahas (2003); and socioeconomic status (SES) using the questionnaire developed by the Brazilian Advertising Association/Brazilian Market Research Association [ABA/ABIPEME] and adapted by Almeida and Wickerhauser (1991).

A questionnaire based on one developed by Coutinho (2007) was designed to evaluate users' perceptions regarding the navigability and attractiveness of the website, as well as the child's learning. After the intervention, the parents or the person in charge were contacted by telephone inquiry about a possible change in the child's behaviour. The data collection was carried out in two phases, beginning after approval by the Research Ethics Committee of the Catholic University of Brasilia (Opinion no. 803.429).

Phase 1 – Website Development: First, the name TODDS Kids (*Todo Dia Divertido e Saudável*) and the logo (Figure 1) were created based on the idea: “Having a healthy life every day can be fun!” The logo was initially drawn on A4 paper and then vectored in the *Adobe Illustrator* program, and is composed of letters that represent toys and games in different environments, and accessible fruits:



Figure 1. TODDS Kids' Website Logo.

In order to create the prototype of the website, aesthetics and an attractive form of information provided in children's educational websites were initially considered. The website was designed using the HTML5 cloud-based web development platform, wix.com, maintained and operated by Wixpress Ltd. (“Wix”).

During the creation phase we sought to elaborate a variety of playful/fun ways of exposing the information to the children's audience (stories, pictures, small texts, videos, games from other web pages). Thus, a pilot study was carried out with 15 children, from 8 to 10 years old, who navigated the site for 1h. Clarity of information, navigability, suggestions and critiques were evaluated by questionnaire. The children's interaction with the site and the pages of greater or lesser interest were also observed.

Phase 2 - Website application: After instrument consolidation, 39 children were divided into groups of 2 to 5 children who individually and freely navigated the site for 1 hour, using the computers of the computer laboratory of the Catholic University of Brasilia (UCB). Children used headsets to listen to website content and also to avoid distractions from external stimuli. Afterwards, the questionnaire was applied to evaluate the children's perceptions (Graph 1 and Table 2), and knowledge acquired through the site (Table 3).

Phase 3 - Phone inquiry to parents: Ten days after the intervention, a telephone survey was carried out containing four questions directed to the parents or tutors/guardians, where they should answer: yes, to a certain extent or no. Due to the time of data collection being the school holidays period, it was only possible to contact 30 of the 39 parents.

Statistical analysis

The data normality of the sample characterization (PAL, SES, body mass, height, BMI, BF) was tested by the Skewness and Kurtosis protocol, in addition to Shapiro-Wilk. Mean and the standard deviation (SD) were calculated for descriptive statistics. Frequency and percentage rate were also calculated for the post-intervention questionnaire data. For the item "grade", minimum and maximum values and the coefficient of variance ($Cv = SD/mean$) were also calculated, verifying how many

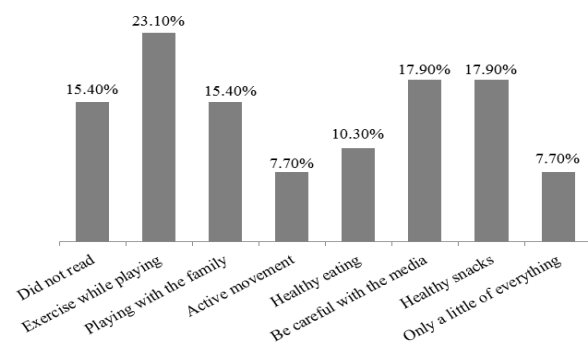
deviated from the mean. Data was tabulated and processed in the SPSS statistical package for Windows, version 20.0.

RESULTS

The navigation bar of the "TODDS KIDS" tool (URL: <http://tododiadivertidoes.wix.com/toddskids>) (Figure 2), provides access to: <Home>, <About us>, <Steps to health>, <Learning with stories>, <More> which give access to: <Videos>, <Also visit>, as well as <Contact us>, and the possibility of downloading the "Schedule/Agenda" created by Pereira et al. (2016) on the <Monitoring Your Health> page. It was possible to verify that the videos attained 38.5% of the children's preference through the questionnaire applied after the session on the website, and whose contents in the form of cartoons referred to children obesity, healthy eating and games. Regarding the lower preference, 76.9% reported that there was no activity that they liked the least, 94.9% approved navigability, and 94.9% would like to meet the research team in person. All children (100%) would indicate access to a friend, and only one did not show interest in accessing it again.

The children were able to access some pages related to healthy habits (My Plate, Nhac, Alana, Let's Move, Smart kids), while the Nhac page was the most accessed by the children (48.7%) due to the presence of games.

The short stories were created by the research team. Graph 1 shows those preferred by children.



Graph 1. Children's Story Preference

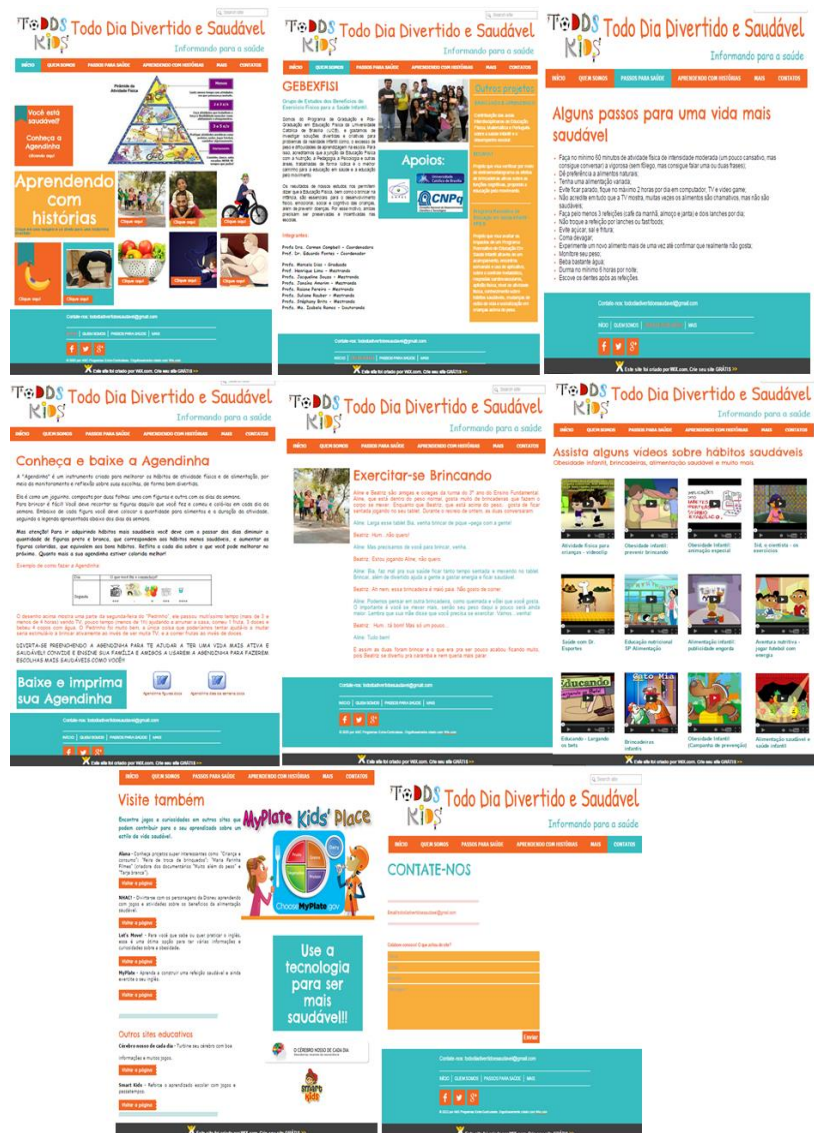


Figure 2. TODDS Kids website pages

In Table 2 shows the evaluation of the website by the children with a grade above 9, when Table 3, the children reported that the healthy snack they ate most frequently is fruit. Among those who reported not wanting to practice more physical activities after browsing the site, the justification was that they were already active.

Table 2
Children's evaluation (0 to 10 points) regarding color, information and images/pictures on the website

	Mean ± standard deviation	C _v
Colors	9.14 ± 1.53	0.17
Information	9.56 ± 0.79	0.08
Images/Pictures	9.4 ± 0.96	0.10

C_v. Coefficient of variance

Table 3
Frequency and percentage rate (%) of answers to questions related to eating habits and physical activity

Question	Yes	No
	n (%)	
Do you eat healthy snacks?	35 (87.9)	4 (10.3)
Do you feel like eating more healthy food after visiting the site?	34 (87.2)	5 (12.8)
Do you feel like doing more physical activity after visiting the site?	36 (92.3)	3 (7.7)
Total	39 (100)	

All children (n = 39) satisfactorily answered the question "Why should I practice physical activity?" 24 (61.5%), 34 (87.2%) and 28 (71.8%) children were able to associate physical activity with healthy eating in their answers to the questions: "According to the website, what should you do to not become obese?"; "Name three attitudes that make you healthier"; "What

did you learn from the site?" Only one volunteer did not answer this last question, claiming to have prior knowledge of the topic.

Table 4 presents responses from parents or guardian/tutors to the telephone survey conducted 10 days after the intervention with the children.

Table 4

Frequency and percentage rate (%) of parents' answers to questions related to healthy habits obtained by telephone survey

Question	Yes	A little	No
	n (%)		
Did your child tell you what they learned on the website they accessed 10 days ago, about children's health?	12 (40)	5 (16.7)	13 (43.3)
Were you more motivated to practice healthy habits after your child accessed the website?	7 (23.3)	7 (23.3)	16 (53.4)
After accessing the website, did you notice if your child has been preferring and asking for healthier habits?	14 (46.7)	2 (6.6)	14 (46.7)
After accessing the website, have you noticed if your child is spending less time in front of the TV/Computer?	7 (23.3)	6 (20)	17 (56.7)
Total	30 (100)		

DISCUSSION

The present study demonstrated that the TODDS Kids website was considered easy to navigate by children, as well as providing them with awareness of healthy habits and could be useful as support material for health and education professionals, as well as parents and/or guardians/tutors.

A pilot study was initially applied with the first version of the website. In it, children's high preference for short and dynamic information was observed, in addition to their fondness for games and videos, emphasizing the power of attractiveness, ludicity and visual effects for this age group. According to Cavalcante et al. (2011), the visual aspect of the instrument is one of the main factors to establish trust with the user.

A combination of cold and warm colors used on the site follow the proposal of Oliveira (2015), who reports that cold colors are processed in the prefrontal cortex and are associated with seriousness and reliable transmission; warm colors are associated to the brain area responsible for the reward state and dopamine release, with green referring to consideration and balance; orange referring to change and the need for repetition of pleasurable

experiences. Thus, the use of these colors being more appealing to both more impulsive and more rational users.

For Fermiano, Bessa, and Cantelli (2013), the colors reinforce the intended message as they refer to emotions, having a strong power of persuasion. In this sense, the combination of the colors used in the site can contribute to a feeling of needing to change to healthier choices, as well as to persuade children with different personalities to become aware of their health.

We observed that 15.4% (n = 6) of the children did not read the stories, while 38.5% emphasized that the videos were their favorite item. This is possibly due to the fact that this is an audiovisual resource with great power of attraction due to its various visual and sound effects (Andrade & Acevedo, 2014; Machado, 2007). However, 30.8% suggested "more games", confirming the findings of Paraskeva, Mysirlaki, and Papagianni (2009), who report that children and young people accumulate approximately 2.5 hours a day in activities related to online multiplayer games, and this weekly workload is considered extensive. However, it is possible to use technology through games by self-reference, and to raise

awareness about technology use, both in terms of time spent and content quality.

Therefore, although technology is largely used in a negative way, electronic games can help teachers as alternative teaching and learning methods (Quiroga, 2009; Paraskeva et al., 2009). Great authors like Piaget, Le Bouche, Wallon, and Freire emphasized the importance of games in the psychosocial development of a child, as well as more recent scholars such as Zea, Sánchez, Gutiérrez, Cabrera & Paderewski (2009). For them, learning while playing allows for the discovery of skills, limitations, abstract thinking and mechanisms of coexistence.

The playfulness of the site may have contributed to the high percentage of correct answers and reports associated with the motivation to practice healthy habits among children after accessing it (Table 3). This is similar to other foreign/international interventions such as “Henry Gets moving” (Nielsen & Rouzier, 2012) and “Take10!” (Kibbe et al., 2011), which verified a significant improvement in body composition, and also in school performance.

The present study sought to provide information for the direct awareness of the child, considering them to be an active and transforming agent of their reality (Libâneo, 2013), making them influential in positive changes in their family (Chenga, Mendonça & Farias Junior, 2014). This can be observed in the responses to the telephone survey by the parents or guardian, in which 46.5% of them considered themselves motivated to improve their habits after the child participated in the intervention (Table 4). This is corroborated by a study by Pereira et al. (2016), where 25% of the parents started a physical activity practice after the child participated in intervention for 2 months at school, emphasizing the importance of interventions in childhood in partnership with family and school.

Based on the limitations of the present study, we suggest that future studies with a larger sample, follow-up time and intervention should be carried out, as well as be extended to family care. Also, anthropometric and physical aptitude assessments, interviews and questionnaires

applied to children should be included to investigate the degree of influence access to the site has on their lifestyle in the long term. However, this initial and innovative study may stimulate the creation of future tools with educational content to be used by health and education professionals, since we observed that the TODDS Kids website can be used as a pedagogical support tool to be used in school for the promotion of child health.

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Conflict of interests:

Nothing to declare.

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