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## Effects of teaching strategies supported by information and communication technologies on satisfaction and learning of college students

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### Abstract

Studies show that Brazil is currently experiencing a double burden of nutritional problems related to malnutrition and other nutritional deficiencies on one side and the onset of the binomial overweight / obesity on a population scale on the other side. Such disorders are linked to complex factors. Therefore it is understood that their resolution will only be possible with the involvement of the whole society. In Brazil, health courses do not address, except for nutritionists and, to some extent, nurses, specific contents on human nutrition, compromising the action of other health professionals in the area. This study aims to contribute to the teaching of basic nutrition content in a course offered to undergraduate healthcare students of a public college in Brazil. The course was restructured in order to meet the educational objectives previously set. New features, educational technologies and materials based on instructional theories and instructional design were developed and included on the course. The main results on satisfaction and learning are presented.

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## 1. Introduction

Even within a context of economic, political and social turmoil, Brazil has changed substantially over the last fifty years due to external factors, derived from a progressively globalized world, and also due to autonomous circumstances associated to its own historical and cultural processes (Batista son & Rissin, 2003). However, the country still faces significant regional disparities in income distribution, contributing to the complex epidemiological situation of nutritional problems, manifested by a double burden of diseases, in which it is observed on one side malnutrition and nutritional deficiencies (especially of iron, iodine and vitamin A), and on the other side problems related to the excessive consumption of processed foods and the appearance of the binomial overweight / obesity on a population scale (Malta et al, 2006; Victora et al, 2011; Mendes, 2012).

One of the causes that explain the increase of the population weight is the change in the eating habits in Brazil. Recent surveys show that 34.2% of the population consumes fatty meat, 56.4% eat whole dairy products, 28.1% make regular use (5 times per week) of sodas and only 20.2% of the population consume daily the adequate amount of fruits and vegetables (IBGE, 2010; Brazil, 2012). There is also evidence of a relationship between poor diet and chronic diseases, among them obesity, cardiovascular diseases and diabetes (Monteiro et al., 2010). These diseases elevate the costs of the health system and, if not prevented and managed properly, demand increasing healthcare investments, which justifies the adoption of integrated sustainable strategies for their prevention and control (Malta et al. 2006). The solution requires interventions at the macro, meso and micro levels, involving government, industry, school, health services, health professionals and families (OECD, 2014).

In Brazil the training of health professionals is done predominantly through classroom courses (Ruiz-Moreno, Milk, & Ajzen, 2013), guided by the traditional pedagogy, but without delivering the desired professionals needed by the population (Buchabqui, Capp, & Petuco, 2006) and without generating relevant changes in current health practices (Batista, & Gonçalves, 2011). Thus, it is important to test differentiated educational strategies in an attempt to reduce the imbalance between the skills of health professionals and the needs of the population. Information and Communication Technologies (ICTs) are being used by educators as a strategy capable to induce the development of new learning methods, that are more dynamic and individualized and able to facilitate the teaching-learning process, contributing to the development of key skills in the area (Westera 2012).

Thus, the central aim of this research is to restructure a basic nutrition course, assessing the effects of new educational methods with the inclusion of teaching strategies supported by information and communication technologies on satisfaction and learning of the students enrolled in it. The hypothesis is that the development of courses and materials supported by a theoretical and empirical research base produce greater satisfaction and lead to greater gains in student's knowledge.

## 2. Method

The 30-hour Basic Nutrition presential course held at a Brazilian public university is offered to students of 5 undergraduate courses. It is a mandatory course for nursing students and an elective course to pharmacy, physiotherapy, occupational therapy and public health students. After the analysis of the profile of students, interviews with the professor responsible for the course and analysis of materials provided the course was restructured according to the cognitive theory, as well as instructional theories. As a complement the Food Guide for the Brazilian Population (Brazil, 2005a) was analyzed to ensure that the minimum knowledge of the area were identified and compared to the themes of the syllabus available.

The restructuring of the course consisted of: (1) defining and classifying educational goals; (2) defining the sequence of instruction; (3) defining the educational procedures; (4) preparing the contents and materials for each class; (5) selecting the media for material distribution (6) developing the presentation format of the content in the virtual environment (Moodle); (7) developing learning and satisfaction assessment tools; (8) training tutors.

The contents extracted from the food guide for the Brazilian population, and the interview with the professor in charge of the course, were transformed into educational objectives (Bloom et al., 1956). The original sequence of the course was kept, with the exclusion of the subject hospital malnutrition and the inclusion of a review class. The learning situations (procedures and educational events) were chosen in order to facilitate the acquisition of the skills

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