

# Gobble: A Decision-Based Game Proposal to Dietary Education

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**Abstract.** *This article proposes a game-based approach to nutrition teaching, with the aim of making the topic more engaging and intuitive. This game focuses on the presentation of random scenarios, presented in the form of cards, for which the players must make a decision and observe its impact on key nutrition indicators. This game-based approach has the potential to promote positive eating habits and contribute to improved public health outcomes.*

**Keywords.** *Educational Games, nutrition education, Sustainability*

## 1. Introduction

This article introduces Gobble, a digital game that addresses nutrition-related topics. Nutritional information from trusted sources is incorporated to determine the impact of each culinary option on health, wellness, and culture. This game was inspired by Reigns [Nerial/Devolver Digital 2016], allowing players familiar with its swiping mechanic to quickly learn it.

The urgent need to understand and prioritize good nutrition marks the current world, characterized by widespread commercialization and consumption of highly processed and unhealthy foods [World Health Organization 2018]. According to an official document that describes the dietary guide for the Brazilian population [BRASIL 2014], the prevalence of obesity and diabetes is rapidly increasing and other chronic diseases related to excessive calorie intake and unbalanced nutrient availability in diets are evolving.

As diet-related diseases continue to escalate globally, comprehensive education and awareness surrounding nutrition have become increasingly imperative. Consistent with this, the World Health Organization (2018) suggests that policymakers should promote consumer awareness of a healthy diet as one of the measures to encourage consumer demand for healthy foods and meals.

According to Vasconcellos et al.(2016), the absence of games that approach health from a more humanistic and community perspective, beyond physiological and pharmacological aspects, is evident. Games that stimulate reflection on personal and collective health could significantly broaden players' horizons and make the field of digital games more relevant to society.

## 2. Related Works

Vasconcellos et al. (2016) examine 47 articles about digital games to understand how they represent different health concepts. The study highlights a notable lack of health

representation from a more human and community perspective. This finding suggests a need for increased reflection and questioning about how health is conceptualized in digital games.

In the topic of nutrition-related games, some of them are worth mentioning as alternative solutions to the issues we address in our work.

Bittencourt et al. (2014) describe the digital game "Cida & Adão" developed to raise awareness of healthy eating among children. It is a 2D platform game with puzzles that features a mechanic where consuming processed foods results in fat accumulation, hindering the characters' performance. In another action game, Dias (2015) has developed DigesTower, a digital educational game that follows a tower defense format in which a hungry child defends against food enemies using digestive enzymes as defense towers.

Agati (2017) presents a serious game specifically designed to guide obesity prevention by addressing three key dimensions of obesity: dietary intake, lifestyle habits, and physical activity.

The digital game "DuchsVille Nutrição" [Corrêa et al. 2013] was developed to aid in the nutritional education process for individuals with Duchenne Muscular Dystrophy (DMD). Set in a supermarket, the game aims to teach concepts related to nutrition, focus on healthy food choices, and increase knowledge of food groups.

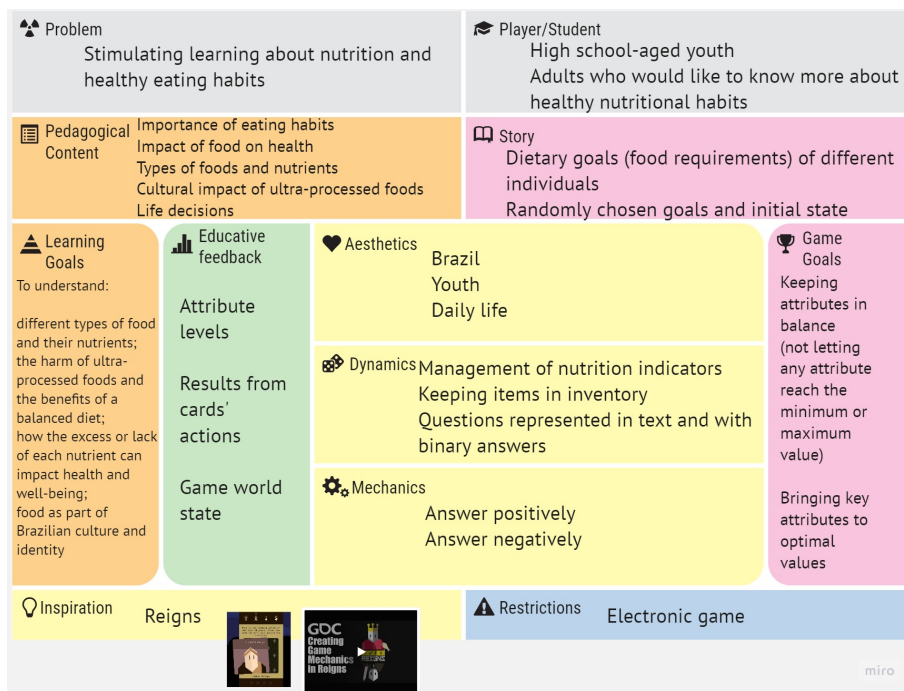
### **3. Game Design**

Our study, which began as a classroom exercise, was not anchored to a specific predefined methodology. However, we did lay out a structured approach using renowned tools. We initiated our research by examining decision-making games recognizing their importance in daily life. Subsequently, a brainstorming activity was conducted to generate ideas for mechanics, aesthetics, stories, and technologies, covering the four elements of the Elementary Tetrad [Schell 2008]. Then, a game design canvas [Taucei 2019] was created to synthesize all relevant information about the Globber game concept from the perspective of educational games, as shown in Figure 1.

One of the main games used as a reference and inspiration for this project is Reigns, developed by Nerial and published by Devolver Digital. Reigns places the player in the role of a king who must make binary decisions in response to a variety of subjects and characters. However, it is the main mechanics of the game that have piqued our interest the most. Reigns involves reading information on a card and swiping it left or right to make a decision, an allusion to the workings of modern dating apps. The player then observes the outcome of that decision, which is reflected in four meters at the top of the screen: Church, People, Army, and Treasury [Alliot 2017].

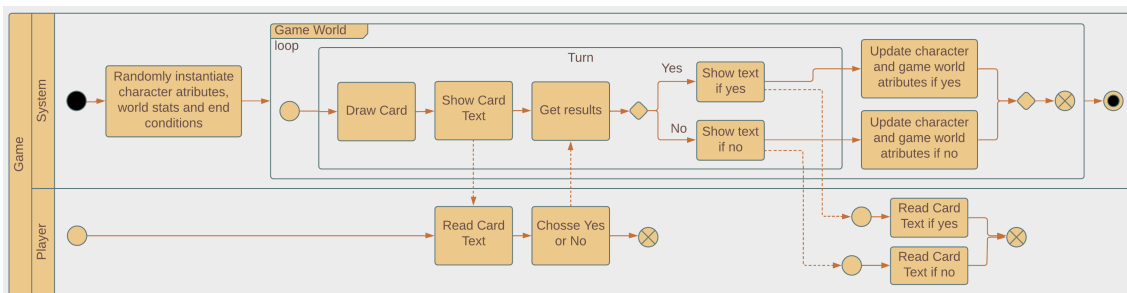
In our game, the player takes the role of a regular person who needs to decide what to eat during the day. When the game starts, the initial values of the main attributes that describe human dietary habits, such as carbohydrate intake, are randomized. A win condition, which is a series of target values for said attributes, is also drawn randomly from a set of possible conditions, which were previously curated to only maintain certain combinations, which lead to a longer and more rewarding game experience.

The game consists of a series of decisions taken sequentially until the game ends, either with the player winning by achieving the preset goal or with the player losing by



**Figure 1. Canvas for conceptualizing Globbe as an educational game**

letting one or more of the key attributes decrease or increase too much. The cards are shown in random order, ensuring a certain level of replayability and emulating some of the uncertainty present in a real scenario. Figure 2 shows the process flow diagram of the game, which summarizes these steps.



**Figure 2. Activity flowchart for Gobble**

To help us determine how each culinary option affected each indicator, we adopt the “Guia Alimentar para a População Brasileira” (Food Guide for the Brazilian Population) [BRASIL 2014] and the “Política Nacional de Alimentação e Nutrição” (National Policy on Food and Nutrition) [BRASIL 2013] as references for obtaining nutritional information on different ingredients and recipes.

### 3.1. Development

In the beginning, we worked on selecting the key attributes that players would need to balance in the game. These should be easy to understand and capable of distinguishing healthy diets from unhealthy ones. First, we opt for carbohydrates, proteins, and total fat

as representative macronutrients. These are relatively well known and can be easily calculated for almost any food by consulting the packaging labels [Simpson and Raubenheimer 2009].

However, in further research, it was perceived that using these macronutrients or simply the number of calories to describe the nutritional impacts of specific foods may be misleading or, at least, incomplete [Privitera 2008] [Taubes 2007]. According to the Guia Alimentar para a População Brasileira [BRASIL 2014], proper nutrition also encompasses social aspects, such as how eating habits and recipes are deeply connected to the culture of a person, and how food may have been subject to industrial processing. Moreover, individuals' nutritional choices are influenced by more than just knowledge and education. Most are probably aware that some foods are healthier than others, but financial decisions and convenience often outweigh health in nutritional choices. [Katy Watson 2016]

Because of that, ultimately, we have decided to use **carbohydrates, protein, total fat, dietary fiber, micronutrients** (which include vitamins and minerals in general), **well-being, stress** and **culture** as our key attributes. This would also be able to keep track of how different foods are associated with stress-reducing effects and with increasing happiness and mental wellness. With the concept defined, we outlined a few more points to include in the player's experience during interaction with the game.

Throughout the game, as certain decisions are made, new possibilities of cards are unlocked. For example, by choosing to pursue certain careers, cards with choices related to such occupations are added to the pool of cards that can be displayed. This gives the game different narrative paths, giving the player the feeling that their decisions matter.

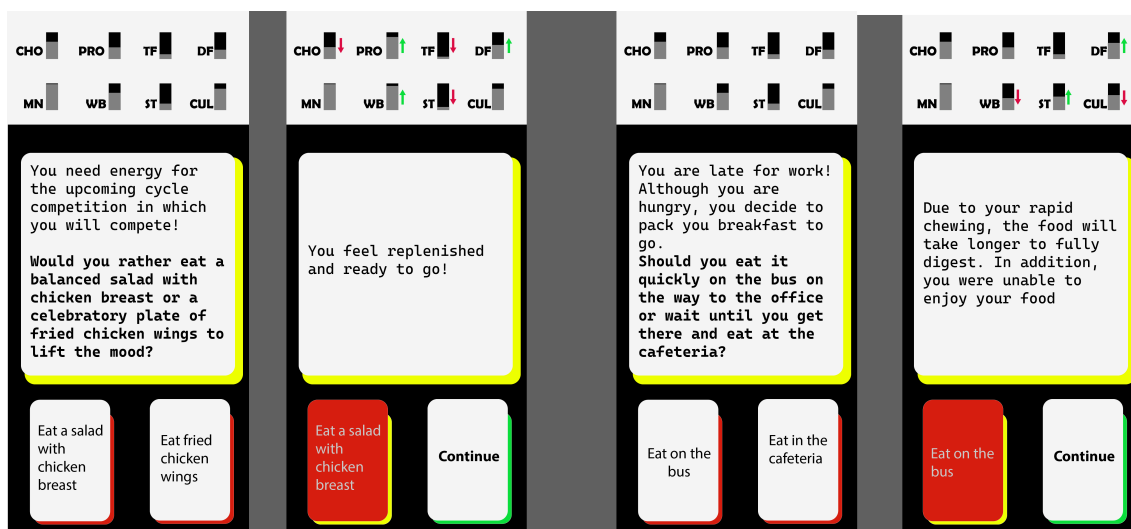
One point of uncertainty encountered was how clear the cards should be regarding their impact on the indicators. We concluded that all necessary information should be provided to the player to support their decisions. In this way, we aim to reduce the frustration of players when faced with questions for which they have no prior knowledge. Also, relevant information that should be remembered by the player should be easily perceived and differentiated from other content that only contributes to the story and has less relevance.

Regarding the technology, we recommend developing the game in the form of a digital game. This is the most practical way to bring the game to life because adding new cards at key decision points would be cumbersome and difficult to control in physical media. Through the digital game, we delegate this tracking function to the software, which organizes the attributes and randomly draws the cards automatically, without causing any inconvenience to the user.

### 3.2. Gobble Interface

Each card has a question to be immediately displayed to the player, along with two options, each with its own text. After selecting one, a text related to the outcome is shown and variations are applied to each indicator.

Figure 3 displays two card examples, each featuring a distinct resolution. The left card centers around a culinary decision, illustrating a game scenario where the player's character adopts the role of a cyclist. The right card, on the other hand, focuses on specific situations related to how food is eaten.



**Figure 3. Current prototype of Gobble**

At the top, you can see eight attributes: CHO (Carbohydrates), PRO (Protein), TF (Total fat), DF (Dietary fiber), MN (Micronutrients), WB (Well-being), ST (Stress), and CUL (Culture). In the middle, there is a prompt card, and below it, two options that the player can choose. After clicking one of the buttons, the resolution screen is displayed, providing information about the consequences of the player’s choice and showing which attributes have increased or decreased.

It’s worth noting that ‘Gobble’ was primarily conceived and developed for the Brazilian audience, with its interface and content originally in Portuguese, given the importance of cultural and social context in nutrition. However, to ensure the cohesion and clarity of this paper, the game mockup shown in Figure 3 has been translated into English. The authentic version intended for the audience must be entirely in Portuguese, aligning with the Brazilian references on nutrition that underpin the project.

#### **4. Conclusions**

We have presented the conceptualization, discussion and current implementation of the prototype of “Gobble”, a game that aims to introduce and stimulate players’ engagement with concepts related to diet and nutrition.

The project fulfills its objective of designing and developing a game on the topic of human nutrition that aims to introduce and familiarize players with this important topic, which is so relevant to our physical and mental well-being and will only become more prevalent in our daily lives in the coming years.

For future enhancements, considering the importance of precision in conveying nutritional information, one avenue we are contemplating is the potential collaboration with health professionals. Their expertise could provide invaluable guidance in refining the game’s content to ensure accuracy and relevance.

In subsequent phases, we also aim to evaluate the game with both nutrition specialists and players to gather feedback, ensuring the game’s effectiveness and alignment with its educational objectives.

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