https://doi.org/10.1590/1678-9865202134e200016

ORIGINAL

The "*Comida de República*" web-based course to promote healthy eating among college students

O curso online "Comida de República" para promover alimentação saudável entre estudantes universitários(as)

Gabriela Milhassi VEDOVATO[1] 0000-0003-1640-0888
Fabrício Gobetti LEONARDI[1] 0000-0003-3854-5957

ABSTRACT

Objective

The work aimed to investigate dietary practices of university students after an action aiming to promote adequate and healthy food.

Methods

The article reports the experience of the distance education course *Comida da República*, promoted by the *Universidade Federal de São Paulo* as an educational space for sharing and exchanging knowledge, experiences, and thoughts on eating in the university context, especially in student homes or fraternities (*repúblicas*). Online questionnaires assessed the profile of participants and changes in their perception or relationship with food. The Students' t-test was adopted to compare perceptions before and after the intervention, and content analysis for qualitative data.

Results

The course had 201 students enrolled and 82 who concluded it, with 35.4% living in *repúblicas*. Before the course, 89.6% of those who completed the course indicated the need to improve their diets, and 57.3% classified their diets as "regular". There was a significant change in perception after the course: 58.5% of those who completed it rated their food as "good". Dietary changes were categorized into two themes: "vision on food production and distribution" and "food and meal consumption". The emerging codes show a greater awareness and criticism about food systems and a greater appreciation of cooking, commensality, and unprocessed and minimally processed foods. Participants identified environmental, personal, and interpersonal barriers (67.1%) to dietary changes. The course emerged as a facilitator of these changes.

[1] Universidade Federal de São Paulo, Instituto Saúde e Sociedade, Diretoria Acadêmica. *Campus* Baixada Santista, R. Silva Jardim, n. 136, Vila Mathias, 11015-020, Santos, SP, Brasil. Correspondence to: GM VEDOVATO. E-mail:<gabriela.vedovato@unifesp.br>.

How to cite this article

Vedovato GM, Leonardi FG. The "*Comida de República*" web-based course to promote healthy eating among college students. Rev Nutr. 2021;34:e200016. https://doi.org/10.1590/1678-9865202134e200016

Conclusion

This intervention proved to be an important educational tool to promote adequate and healthy eating, in addition to contributing to the planning and execution of student affairs and food security policies.

Keywords: Education, Distance. Food and Nutrition Education. Student Health. Universities.

RESUMO

Objetivo

O trabalho teve como objetivo investigar práticas alimentares de universitários(as) após uma ação de promoção de alimentação adequada e saudável.

Métodos

Trata-se de relato do curso de educação a distância "Comida de República", promovido pela Universidade Federal de São Paulo, como espaço educativo para compartilhamento e troca de conhecimentos, experiências e reflexões sobre alimentação no contexto universitário, especialmente em moradias estudantis (repúblicas). Questionários online avaliaram o perfil dos participantes e as mudanças na percepção e relação com a alimentação. Adotou-se o Teste t pareado para comparar percepções antes e depois da intervenção e análise de conteúdo para os dados qualitativos.

Resultados

O curso contou com 201 iniciantes e 82 concluintes, sendo que 35,4% viviam em repúblicas. Antes do curso, 89,6% dos concluintes apontaram a necessidade de melhorar a alimentação e 57,3% classificaram sua alimentação como "regular". Houve significativa mudança de percepção após o curso: 58,5% dos concluintes classificaram a alimentação como "boa". As mudanças alimentares foram categorizadas em dois temas: "visão sobre produção e distribuição de alimentos" e "consumo de alimentos e refeições". Os códigos emergentes mostraram uma maior consciência e criticidade sobre sistemas alimentares e uma maior valorização do ato de cozinhar, da comensalidade e de alimentos in natura e minimamente processados. Os participantes encontraram barreiras (67,1%) ambientais, pessoais e interpessoais para efetivar mudanças alimentares. O curso emergiu como um facilitador dessas mudanças.

Conclusão

Essa intervenção mostrou-se um relevante instrumento de educação para promoção da alimentação adequada e saudável, além de contribuir com o planejamento e execução de políticas de permanência estudantil e de segurança alimentar e nutricional.

Palavras-chave: *Educação a distância. Educação Alimentar e Nutricional. Saúde do Estudante. Universidades.*

INTRODUCTION

Admission into university implies modifications in the student life and routine, and constitutes a critical period regarding changes in health behavior [1-4]. The eating patterns in college population are characterized by the high consumption of ultra-processed products and fast foods, frequently skipping meals, and low consumption of natural or minimally processed foods, such as rice, beans, milk, fruits, and vegetables [4,5]. Less healthy eating patterns in the higher education context can be associated with sedentary behavior and alcoholic beverage consumption, which leads to low quality of life and negative health outcomes [2,6].

Several factors influence the eating behavior of university students, including socioeconomic issues, knowledge, values and beliefs about food, body perception and self-image, preferences, time available for meals, discipline, level of physical activity [3,4,7]. In addition, there are specific factors related to the students' experience (i.e. type of housing, groups, university lifestyle, academic activities), the social and family context (i.e. parental control, family education, social support, peer pressure), the physical environment (i.e. availability, geographical and financial access to healthier foods, cooking utensils), as well as structural determinants (i.e. policies, programs, legislation, socio-cultural norms, media and advertising) [1,3,8].

The *Plano Nacional de Assistência Estudantil* (PNAES, National Plan of Student Assistance), promulgated in 2010, has encouraged the implementation of affirmative actions to guarantee assistance, permanence, and conclusion of courses by students inserted in Brazilian higher education, including housing, food, and health attention [9]. In view of this, public universities invest in policies focused mainly on university restaurants, which are subsidized and associated with meals of better nutritional quality [4,10]. Considering that not all universities (especially the private ones) can count on these restaurants, and not all daily meals are included on their menus, it is essential to promote actions that encourage students' autonomy to choose and prepare their own food [11,12].

Access to information, culinary practice, and commensality are fundamental principles for an adequate and healthy diet [4,11-15]. Living with family members or with colleagues and friends in student fraternities and sororities (popularly known as *repúblicas* in Brazil), as well as cooking and sharing meals increase the chances of eating healthier foods [12]. In contrast, the lack of meal planning and poor cooking skills are linked to a higher consumption of ultra-processed foods [13,15]. Thus, there is a need to investigate the dietary practices of university students and develop viable and appropriate intervention strategies focusing on the students' realities [5,9]. Various food and nutritional intervention programs targeting young adults in university have been adopting information and communication technologies, and studies in this field are fundamental in the current context, especially when utilizing innovative virtual learning environments and participatory methodologies [6,16,17]. Educational interventions should foster comprehensive discussions about food systems, and eating habits under culture, environment and society debates [15]. Furthermore, universities have an actual and essential role in promoting health even besides the academic context, for instance encouraging commensality in *repúblicas* and cooking as an emancipatory practice [11,13,14].

Therefore, this article presents the course *Comida de República* as an institutional action promoted by the Universidade Federal de São Paulo (Unifesp), which promotes a virtual learning environment to encourage adequate and healthy eating in the context of university life. The objective is to present the theoretical and methodological framework of the intervention and investigate its potential to influence students' eating decisions.

METHODS

The study was a web-based intervention promoted by the *Universidade Federal de São Paulo, Pró-Reitoria de Assuntos Estudantis* (PRAE, Office of the Dean of Student Affairs) as a Distance Education Course based on the Moodle software platform. The intervention targeted undergraduate students, with the aim of problematizing the university experience in its various determinations, especially food and its biological, psychological, social, cultural, economic, environmental, and political interfaces.

The pedagogical inspiration came from the principles of Popular Education, which emerges from the socio-historical reality of the participants to produce dialogic relationships and an educational space for reflection and knowledge-sharing to build concrete, meaningful, and transformative social strategies in the context of the university and life [18]. In this perspective, the following pedagogical moments were proposed: reality study, theoretical deepening, and action strategy. The educational practice relied on the Freirean concept of "*praxis*", the action-reflection-action cycle [19]. Thus, the educational process raised and proposed new ways of acting, employing the students' experiences and life stories, as well as dialogic and horizontal relationships, to deepen the theoretical debate [18,20].

Online discussion forums were facilitated by the research team aiming to stimulate interactivity and participation by enabling recursion and multiple manifestations, connections, and trajectories. The

coordinators (a nutritionist and a social worker) were responsible for the elaboration of pedagogical strategies, materials, and contents, and for providing technical-scientific support to tutors. The tutors had the task of continuously interacting with the participants, raising reflections and answering questions, and this role was played by nutritionists linked to PRAE-Unifesp, scholarship students, and previous participants.

The course was oriented by the Reference Landmark for Food and Nutrition Education and had the Dietary Guidelines for the Brazilian Population as the main theoretical framework [15,21]. The educational activities, structured in six blocks (Chart 1), were developed over eight weeks (total of 20 hours). During the formative process, the participants were mobilized to reflect and discuss about the dimensions and main issues involved in the act of eating, especially in the face of the challenges of the contemporary university routine. Although the course covers food-related questions in *repúblicas* (focusing particularly those students living far away from their family homes), many students still live with family members and/or in different contexts of life, which increases diversity in the discussions and the possibilities and configurations of eating dynamics. Thus, the course is not limited to dealing with issues individually, but aims to foster debates about the food that comes to the plate, and about the current dilemmas as eaters, consumers, and citizens.

Besides the thematic units, resources and activities (online presentations, readings, videos, forums), the course had a transversal component: *Caldeirão de Dicas* (Cauldron of Clues). In this space, participants were encouraged to share recipes, ideas, innovations, and strategies (images, videos, texts) that facilitate

Chart 1 – Structure and content of the course. *Comida de República*, Unifesp, 2015-2019.

1 of 2

Unit	Topic	Objective	Learning topics	Pedagogical resources and activities
1	Presentation	1. Familiarization with the virtual learning environment; 2. To present the course proposal and objectives; 3. To provide initial interaction.	Moodle software platform.	Initial text and Moodle tutorial; Video of the course; Forum: presentation; Initial questionnaire.
2	Food: memory, care, identity, citizenship and the nutrients?	1. To present different dimensions and the complexity of contemporary eating; 2. To know the universe and food repertoire of the participants; 3. To identify how the students structure (or does not structure) their food day and meals in the context of the college routine; 4. To identify the students' relationship with their food, meals, and their culinary skills; 5. To create an initial atmosphere of questions and reflections on the act of eating.	Several dimensions of the act of eating, besides biological and nutritional needs: psychological, social, cultural, environmental, ethical, political; Concepts: nutrients, foods, meals.	Online presentation (texts and music): "Food: symbolic focus"; Audio of the chronicle "Ovo" (Egg) by Luís Fernando Veríssimo; Video: "Cooking as a political act" by Michael Pollan; Thematic forum: "How I eat".
3	Eating in "*República*"	1. To explore issues related to the availability, access, and choice of food by university students; 2. To identify the student's relationship with their universe of experience and housing with other people (students and/or family) in the context of food.	Food environment (community and household); Commensality; College students' eating practices.	Images about what families consume around the world (Project Hungry Planet); Video with testimonials from university workers about how was their eating habits during the time spent at the university; Reading: "Beans with rice and rice with beans: Brazil in the Brazilian dish" (Lívia Barbosa); Thematic forum: "What do university students eat in *repúblicas*?".

Chart 1 – Structure and content of the course. Comida de República, Unifesp, 2015-2019.

2 of 2

Unit	Topic	Objective	Learning topics	Pedagogical resources and activities
4	Capitalism and Food Policy: a critical view of the food on the plate	1. To foster critical reflections on the production and trading system of foods that reach the consumer's table, and the intrinsic relationship between the food industry and the market.	Capitalism and food consumption; Structural and cyclical dilemmas that determine food production food logic.	Film: Food Inc. (USA, 2008); Reading "Capitalism and food policy: The world cannot be a great supermarket" (João Pedro Stédile) and "Food Sovereignty: a necessity of the peoples" (João Pedro Stédile and Horacio Martins de Carvalho); Quizz about the articles; Thematic forum: "Building together: food production in the capitalist system".
5	Gastro-anomy	1. To discuss the concept "Gastro-anomy" (Claude Fischler); 2. To present the Dietary Guidelines for the Brazilian Population; 3. To encourage culinary practice and other eating changes.	Gastro-anomy (Claude Fischler) that expresses the current disruption and individualization of the act of eating; Empowerment, food autonomy and how to improve cooking skills; Principles of adequate and healthy eating according to Dietary Guidelines for the Brazilian Population: "food is more than the intake of nutrients"; discouraging the consumption of ultra-processed foods; the importance of eating regularly and carefully, in appropriate environments and in company.	Claude Fischler's interview on "Culture and Gastro-anomie: Psychopathology of Everyday Food"; Ten steps for healthy eating; Thematic forum: "Cooking workshop: coming out of the closet, oops,... from the pantry!".
6	Final product	1. To systematize the experience in the Course in order to collectively recognize the main food issues that surround the university context; 2. To identify the impacts of the course on eating changes.	Adequate, healthy, and sustainable food; The role of open markets (street markets that sells fresh products) in the students' eating habits.	Experience: "*De mochila na Feira*"; Photovoice and narratives about food environment and healthy eating; Final questionnaire.

daily eating. And so, the role of tutoring was to problematize issues such as access, quality of ingredients, availability of resources (cost, equipment and utensils, *etc*.), and skills.

The course was advertised to all six undergraduate campuses and by the coordinators on websites, social networks, and posters. It was created in 2015 and, in 2019, its seventh edition was held. Since 2018, it has been promoted as an extension action and open to the external community, including students and professionals from other public and private universities. A total of 459 students was enrolled, and an average proportion of 60.6% of participants started the course's activities and 37.8% of them completed the course.

In this study, were analyzed data obtained from participants who completed the initial (n=201) and the final (n=82) online questionnaires of the seven editions of the course. The questionnaires were made available on the course's platform, and were filled out by the participants of each edition (2015-2019) at the time of the course. The variables to describe the participants' characteristics and some eating practices were: area of the university *campus*; type of residence; company for meals; meal location at home; cooking skill; use of the university restaurant; perception of the need to change eating habits. Pearson Chi-Square test (2-sided) was performed to compare differences between the characteristics of participants' who started and finished the course. The frequency, central tendency, and dispersion of the variables were obtained to

describe the participants and the possible eating changes. To quantitatively assess these changes, the paired Student's t-test was used to compare the individual's relationship with food before and after the course (outcome variable): (1) very good; (2) good; (3) regular; (4) bad/very bad. Although the outcome variable was very general and not able to capture the complexity of the eating changes, it was adopted to signal any possible food-related perception of change influenced by the intervention, which were better understood by the complementary qualitative approach. A significance level of $p<0.05$ was considered and the analyzes were performed using the statistical software SPSS® (version 25, SPSS Inc., Chicago, IL, USA).

The qualitative outcome evaluation was performed to capture perceived changes, barriers, and facilitators among participants, and involved a thematic content analysis. An inductive approach was adopted to identify themes and codes emerging from the answers to three following open questions: "what were the main eating changes after the course? what were the main barriers/facilitators to change?". An ecological framework was used to guide the content analysis, and identify multiple levels of factors (such as intrapersonal, interpersonal, environmental) and structural attributes that may have influenced the reported changes positively or negatively, to an adequate and healthy eating in the context of university life and the course participation. Ecological models of health behavior consider the interactions between individual characteristics and their social and physical contexts, which can include for example, friends, family, housing and community settings, formal and informal groups and organizations, university and urban environments [22].

This study was approved by the Unifesp Research Ethics Committee (Process n. 0479/2019).

RESULTS

Of a total of 201 starting participants, 82 completed the activities (adherence rate: 40.8%) and answered both questionnaires in the course (Table 1). The majority were from campuses in the areas of Health Sciences (37.3% of the enrolled and 40.2% of the ones who completed the course, respectively), Computer Sciences (22.9% and 26.8%) and Human and Social Sciences (19.9% and 15.9%). The average age (±Standard Deviation) of participants was 23 years (±6.2), with 35.4% reporting living in *repúblicas* and 47.6% with family members. Most undergraduates reported knowing how to cook, even if minimally (97.5%), but have their major meals at the university restaurant (89.0%). The need to change eating habits and improve the relationship with food was strongly recognized by starting (90%) and concluding participants (86.6%) before the course. The concluding participants did not differ from the starting students in the sociodemographic and dietary characteristics, except for the use of the university restaurant, which was significantly less frequent among them.

Before the course, 57.3% of the participants classified their diet as "regular", and only 26.8% as "good" (Table 2). The perception of the relationship with food changed significantly after the course, with a decrease in "regular" perception (29.3%) and an increase in "good" perception (58.5%). After the course, 87.8% of the participants observed eating changes (Table 3), categorized into two themes: "views on food production and distribution" and "consumption of food and meals".

Five codes of the theme "views on food production and distribution" emerged, which highlighted aspects related to a greater awareness and criticality about food systems: socio-environmental impacts (concerns with social and environmental issues related to the production, commercialization and consumption of food, especially those with high degree of processing); economic and labor issues (logic of profit and exploitation of labor from the perspective of capitalism); concerns with food origin (individual concern that

Table 1 – Participants' profiles. *Comida de República*, Unifesp, 2015-2019.

	Starting participants[1]		Concluding participants[2]	
	n	%	n	%
University Campuses Course Area				
Health Sciences	75	37.3	33	40.2
Computer Sciences	46	22.9	22	26.8
Human and Social Sciences	40	19.9	13	15.9
Biological and Chemical Sciences	15	7.5	8	9.8
Accounting and Economic Sciences	12	6.0	3	3.7
Medical Sciences	5	2.5	0	0
External participants	8	4.0	3	3.7
Type of residence				
Student homes – "*repúblicas*"	84	41.8	29	35.4
Family/Parents	85	42.3	39	47.6
Alone	13	6.5	7	8.5
Boarding house	19	9.5	7	8.5
Cooking skills				
Knows how to cook	116	57.7	43	52.4
Can cook a little	78	38.8	37	45.1
Not able to cook	7	3.5	2	2.4
Have company for meals	93	46.3	35	42.7
Main meal location at home				
Kitchen	95	47.3	39	47.6
Living room	73	36.3	31	37.8
Bedroom	33	16.4	12	14.6
Use of the university restaurant*				
No	22	10.9	9	11.0
Yes, just lunch	105	52.2	52	63.4
Yes, just dinner	6	3.0	2	2.4
Yes, lunch and dinner	68	33.8	19	23.2
Need to change eating habits and relationship with food	**181**	**90**	**71**	**86.6**

Note: [1]Enrolled participants who completed the initial questionnaire (n=201); [2]Enrolled participants who completed the course activities, as well as the initial and final questionnaires (n=82); *Chi-squared test (2-sided, linear-by-linear association), $p< 0.05$.

Table 2 – Relationship with food before and after the intervention. *Comida de República*, Unifesp, 2015-2019.

Relationship with food[1]	Pre-intervention				Post-intervention				Diference between means	SD	p^*
	n	%	Mean	SD	n	%	Mean	SD			
Very good	1	8.5	2.63	0.75	4	4.9	2.39	0.70	0.24	0.73	0.00
Good	22	26.8			48	58.5					
Regular	47	57.3			24	29.3					
Bad/very bad	6	7.3			6	7.3					

Note: (n=82); [1]Categories: 1: very good; 2: good; 3: regular; 4: bad/very bad; *Paired Student's t-test; SD: Standard Deviation.

the food produced is known and recognized as safe and healthy); valuing healthier and more sustainable food circuits (importance of shorter farming systems, based on agroecology and organic production); reflection on food choices (critical-reflexive attitude about the relationship between human beings and their food).

From the theme "consumption of food and meals", six codes emerged, relating to individual changes in the context of nutrition, health, and well-being: increased repertoire of foods and/or recipes (curiosity to try new foods/recipes); cooking (greater appreciation and availability to prepare their own

Table 3 – Perception about eating changes, barriers, and facilitators after the intervention. *Comida de República*, Unifesp, 2015-2019.

1 of 2

Perceptions	
Observed any eating change	n=72 87.8%
Themes	
1. Views on food production and distribution	
Codes	Examples of speeches
1.1. Socio-environmental impacts	*Think about the political context of food, especially about where it comes from and where the garbage that it produces goes, and also about its environmental impact.*
1.2. Economic and labor issues	*Critically thinking about where our food comes from, the [...] industries and big food corporations, and their role in society, their marketing, as well as non-compliance with laws and the vision of the profit above all.*
1.3. Concerns with food origin	*Observe the origin of the food, [...] paying more attention to the ingredients, quality and origin [...] concerned with looking at labels.*
1.4. Valuing healthier and more sustainable food circuits	*Consuming products from local producers[...] I started to choose a farmers market in the neighborhood where the campus is located [...] and buy at an organic market instead of going to the supermarket to buy fresh products.*
1.5. Reflection on food choices	*I think the main change was how I started to see food [...] I reflected a lot on the relationship between human beings and food [...] and I started to eat more consciously.*
2. Consumption of food and meals	
2.1. Repertoire of foods and/or recipes	*I have been trying new things, new foods, out of the conventional, [...] and new ideas for recipes.*
2.2. Cooking	*Giving more value to the act of cooking [...] and preparing more my own foods and dishes.*
2.3. Commensality	*I stopped having lunch while studying or doing other things, and I started to prioritize time to have lunch with people I like, not books anymore.*
2.4. Meal planning	*I started to better organize my eating time [...] and to choose a healthier meal, with better nutritional quality.*
2.5. Consumption of natural and/or minimally processed foods	*Choosing more natural foods like those at the open market, and trying to avoid industrialized foods. These were things that I already had in mind, and that the course reinforced, so that I wanted to put them into practice [...] more salads and fruits, taking my favorites to eat at university or at work.*
2.6. Consumption of ultra-processed foods	*Paying more attention to processed foods [...] decreasing the consumption of snacks and delivered ready-to-eat and fast foods [...] I stopped eating so many junky food, especially at the weekends [...] I stopped eating "noodles" and sausages [laughs] and I'm much more intolerant to industrialized products and "fast food"!*
Faced barriers	n=55 67.1%
3. Environmental barrier	
3.1. Information	*Unfortunately, there is still a lack of information about suppliers and food companies in order to make my choices in a more ethical and political way.*
3.2. Physical and geographic access	*Difficulty in finding traditional markets, and lack of alternative and organic vendors.*
3.3. Financial access	*Financial, especially about organic foods that are so expensive.*
4. Personal barrier	
4.1. Lack of money	*Money to buy more vegetables.*
4.2. Lack of time	*The rush of everyday life is the most complicated barrier. During the semester it is difficult [...] I am focused on things like studying and there is no time to eat better.*
4.3. Lack of motivation	*I lack determination to reduce the junk food. [laughter].*
4.4. Cooking skills	*Lack of knowledge and ability to prepare food.*
4.5. Diseases	*Binge eating.*
4.6. Psychological aspects	*It is something psychological that I still need to work on.*
4.5. Sensory and hedonic aspects	*I love to eat tasty foods that are not healthy.*
5. Interpersonal barrier	
5.1. Family and friends	*My family doesn't eat very well, so anything new and healthier that I bring is not so well received.*
5.2. Lack of company	Cooking alone is more boring; it is more difficult to have a more varied meal.

Table 3 – Perception about eating changes, barriers, and facilitators after the intervention. *Comida de República*, Unifesp, 2015-2019.

1 of 2

Perceptions	
Observed any eating change	n=72 87.8%
Themes	
Views on food production and distribution	
Codes	Examples of speeches
Faced facilitators	n=49 59.1%
6.Course as a facilitator	
6.1. Contents and/or interaction	*The course's educational materials, the complementary resources, and the discussion with friends and teachers were the main facilitators for this new critical way to look in relation to food.*
7. Environmental facilitator	
7.1. Information	*Lots of information available on the internet about food and recipes.*
7.2. Physical access	*The presence of small farmers and bulk food stores close to the university campus.*
8. Personal facilitator	
8.1. Motivation	*I started preparing lunchboxes at the weekend, so when I didn't have access to the university restaurant, I didn't choose junk food.*
8.2. Knowledge and skills	*Culinary skills [...] and closeness to topics related to food.*
9. Interpersonal facilitator	
9.1. Family	*My mom, I talked to her and she decided to helped me out with some recipes, even sending me healthier foods sometimes.*
9.12. Members of *república*/friends	*My fellows from repúblicas also adhered to the idea.*

food); commensality (recognition of the meal as a moment of social interaction); meal planning (greater investment in planning meals and choosing foods); increased consumption of natural and/or minimally processed foods; decreased consumption of ultra-processed foods.

Attempting to make changes in eating habits, 67.1% of participants faced barriers, categorized into environmental, personal, and interpersonal (Table 3). The codes that emerged in the "environmental" category are related to the lack of information and difficulties in physical, geographic, or financial access to healthier foods. In the "personal" category, the codes were: lack of money, time and motivation for changes, little ability to cook, issues related to diseases, psychological aspects and the solidity of previous eating habits, and food preferences based on sensory and hedonic aspects. In "interpersonal" barriers, codes were related to family and friends and the lack of company for meals.

Regarding the facilitators (59%) (Table 3), the course content and educational interactions were identified as important in triggering the process of changing eating practices.

DISCUSSION

The course proved to be a relevant strategy to promote an adequate and healthy diet among university students. The focus given to other dimensions of the act of eating, beyond biological and nutritional issues, shows that the current intervention proposal is in line with the Food Guide for the Brazilian Population [15]. In the literature, most of the interventions for university students focus on outcomes related to health and the nutritional adequacy of the diet, with few studies aiming at stimulating commensality, cooking skills and reflexive attitudes towards food and environmental sustainability [6,11,12,14,17,23]. Incorporating

social, cultural, environmental, economic, and political aspects into Food and Nutrition Education programs is essential to achieving greater adequacy and effectiveness [21].

In general, the course produced changes in knowledge and attitudes about food. The participants reported greater awareness and criticality of their own food choices and how they may foster hegemonic food systems, based on agribusiness and large-scale production of foods with a high degree of industrial processing, and negative impacts. Thus, understanding that these issues affect society and the environment in an ethical and macro-political perspective influences food choices and consumption behaviors [24].

After the course, there was a significant modification in the perception of their relationship with food, which went from "regular" to "good". The main eating changes, at the behavioral level, were lower intentions to consume ultra-processed products and higher preference for fruits and vegetables, even in periods of more intense academic routine. Knowledge, perceptions, and positive attitudes towards healthy eating may lead to a better relationship with food and healthier behaviors over time [1,15]. Other web-based dietary interventions with university students identified a predominant effect on cognitive variables, and low on behavioral variables [6]. Thus, achieving changes related to the selection, purchase, and preparation of food in the college context constitutes a methodological challenge for interventions.

The majority of participants reported knowing how to cook at the beginning of the course and, at the end, there was an increase in interest in new culinary techniques and the repertoire of food and recipes. The facilitation of the course forums encouraged the behavior of cooking from an emancipatory and political perspective, which also meant defending the use of fresh foods (and/or with a low degree of industrial processing), and supporting local, fairer, and more sustainable food systems [15]. Likewise, based on the precept that the kitchen constitutes a creative space and structure of the food identity of groups, this intervention presented the Cauldron of Clues as a dialogical component and strategic collection of information and ideas to facilitate and transform the students' food routines [25]. The disclosure of ingredients, equipment, culinary techniques, rituals, traditions, and stories involved in food preparation provides a greater understanding of eating practices, and supports the development and testing of recipes to inform interventions focused on cooking [12,13,25].

Despite the cooking skills, most of the participants reported having their main meals at the university restaurant. In 2017, Unifesp instituted its Food Policy, making progress on issues of the university restaurant related to access and quality [26]. In this context, the course emerged as an observatory of eating practices, and also as a management tool in health care and to promote nutritional security in order to monitor and evaluate the impact of the university restaurant on the students' food dynamics. Interestingly, in this study we observed that among the concluding participants there was significantly less use of the university restaurant, compared to the participants who had just started the course. That may indicate a greater interest and need to improve knowledge and eating practices.

Participants identified barriers, such as lack of access, time, money, organization, motivation, support, and company for meals at home. Issues related to the lack of physical and financial access corroborate other studies with university students in Brazil [4, 5, 10] and in other countries [3]. Also, social support at this phase of life, especially from family and friends, seems to have an important influence on food quality, because it affects psychosocial and environmental aspects [3,10]. In this study, although a large part of the participants lives in *repúblicas* or with family members, a considerable proportion of students ate alone. As eating with company positively influences food consumption, the course encourages the gathering of efforts and division of tasks related to planning food purchases and cooking in shared houses, in addition to sharing meals [15]. Future studies may deepen the understanding of factors that influence eating behaviors during the academic journey, including commensality and aspects of the physical and social environment.

The course was identified as an important facilitator for eating changes. The educational resources stimulated wide reflections on aspects that go beyond the complexity of the food path from "field to table", and included socioeconomic and ethical discussions. Hence, they allowed the collective and collaborative construction of strategies for less industrially processed food, more planned, shared, and suitable for university life. Considering that a large part of the web-based interventions with university students works with standard messages, this course, based on Popular Education, presented an innovative approach close to the students' realities [6,16,17,23]. The role of students as tutors was essential to reach peers and promote the construction of knowledge and practices in a sensitive way and connected to the universe of college life.

Information and communication technologies were powerful devices to promote dialogic teaching using interactive educational processes, which facilitated the collective production at the individual and group level [20]. In this intervention, the internet design was not limited to overcoming space-time distances, nor to the unidirectional transposition of information and rigidly structured tasks. Contrarily, the current action promoted a collaborative learning environment with horizontal knowledge exchange, supportive and dialogic argumentation, and peer feedback. Even though digital technologies facilitate the educational process through the improvement of access, inclusion, time flexibility, agility for tasks, comprehensiveness, and reach among students, the adherence, participation, and completion rates in distance education are still a challenge, and need to be further investigated [20].

It is worth recognizing that this course was an advantageous approach to overcome the geographical distance and involve students from different university campuses and settings. The extensionist nature and the participation of the external audience allow the reproduction of this educational proposal in other institutions. However, some limitations of the study are to be acknowledged: firstly, the students decided to participate in the course themselves, and therefore the study participants may have had a special interest in discussing the intervention topics and been more open to change their eating behaviors. Secondly, the intervention design did not include a control group, and this fact limits the possibility of attributing the changes in students' perceptions we observed exclusively to the effect of the course participation. Additionally, we did not adopt validated questionnaires to evaluate the impact of the intervention on students' eating practices. However, the adoption of both quantitative and qualitative methodologies in a complementary way allowed a greater and deeper understanding of the individual's consumption intention and the relationship with food after participating in the course.

CONCLUSION

In summary, this article presents an overview of the course *Comida de República* as an educational and management strategy to promote adequate and healthy food in the university context. The course, based on Popular Education, played an important role in building knowledge and perceptions of college students about healthy eating in contemporary times, in line with the Dietary Guidelines for the Brazilian Population. Concerns about the negative impacts of hegemonic food systems on social and environmental issues generated discussions about individual food choices, which may have reflected in eating changes among participants, especially a greater awareness of the importance of cooking, commensality, and meal planning, and the intention to increase the consumption of minimally processed foods and decrease ultra-processed products, even when the routine of academic work is most intense. Additionally, a positive perception of change occurred regarding participants' relationship with their food after the intervention. The participants also reported environmental, personal and interpersonal barriers to achieve a healthier diet, such as lack of access, time, and support from family and friends. The course worked as a facilitator of the described eating changes, with emphasis on its educational content, strategies, and the tutoring role in the learning process closer to the university students' social reality.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the students in the Course for their kindness to participate in this research, and all the members of the tutoring team (nutritionists and students) for their enthusiasm, help, and support. We also acknowledge the institutional support from the Office of the Dean of Student Affairs (PRAE-Unifesp).

CONTRIBUTORS

GM VEDOVATO was involved in designing the study, analyzing and interpreting the data, writing and revising the paper. LEONARDI FG was also involved in designing the study, analyzing and interpreting the data, and critically revising the paper. Both authors read and approved the final manuscript.

REFERENCES

1. Hilger J, Loerbroks A, Diehl K. Eating behaviour of university students in Germany: dietary intake, barriers to healthy eating and changes in eating behaviour since the time of matriculation. Appetite. 2017;109:100-7. https://doi.org/10.1016/j.appet.2016.11.016
2. Deforche B, Van Dyck D, Deliens T, De Bourdeaudhuij I. Changes in weight, physical activity, sedentary behaviour and dietary intake during the transition to higher education: a prospective study. Int J Behav Nutr Phys Act. 2015;12(1):16. https://doi.org/10.1186/s12966-015-0173-9
3. Deliens T, Clarys P, De Bourdeaudhuij I, Deforche B. Determinants of eating behaviour in university students: a qualitative study using focus group discussions. Bmc Public Health. 2014;14(1):53. https://doi.org/10.1186/1471-2458-14-53
4. Bernardo GL, Jomori MM, Fernandes AC, Proença RPC. Food intake of university students. Rev Nutr. 2017;30(6):847-65. https://doi.org/10.1590/1678-98652017000600016
5. Perez PMP, Castro IRR, Franco AS, Bandoni DH, Wolkoff DB. Dietary practices of quota and non-quota students at a Brazilian public university. Ciênc Saúde Coletiva. 2016;21(2):531-42. https://doi.org/10.1590/1413-81232015212.01732015
6. Belogianni K, Baldwin C. Types of interventions targeting dietary, physical activity, and weight-related outcomes among university students: a systematic review of systematic reviews. Adv Nutr. 2019. https://doi.org/10.1093/advances/nmz027
7. Borba TP, Silva MV, Jomori MM, Bernardo GL, Fernandes AC, Proença RPC, *et al.* Self-efficacy in cooking and consuming fruits and vegetables among Brazilian university students: the relationship with sociodemographic characteristics. Br Food J. 2021. https://doi.org/10.1108/BFJ-04-2020-0311
8. Franco AS, Canella DS, Perez PMP, Bandoni DH, Castro IRR. University food environment: characterization and changes from 2011 to 2016 in a Brazilian public university. Rev Nutr. 2020;33. https://doi.org/10.1590/1678-9865202033e200058
9. Borsato FP, Moraes Alves J. Student assistance in higher education in Brazil. Proc Social Behav Sci. 2015;174:1542-9. https://doi.org/10.1016/j.sbspro.2015.01.786
10. Hartmann Y, Botelho R, Akutsu R, Puppin Zandonadi R. Consumption of fruits and vegetables by low-income Brazilian undergraduate students: a cross-sectional study. Nutrients. 2018;10(8):1121. https://doi.org/10.3390/nu10081121
11. Bernardo GL, Jomori MM, Fernandes AC, Colussi CF, Condrasky MD, Costa Proença RP. Positive impact of a cooking skills intervention among Brazilian university students: six months follow-up of a randomized controlled trial. Appetite. 2018. https://doi.org/10.1016/j.appet.2018.08.014
12. Deliens T, Van Crombruggen R, Verbruggen S, De Bourdeaudhuij I, Deforche B, Clarys P. Dietary interventions among university students: a systematic review. Appetite. 2016;105:14-26. https://doi.org/10.1016/j.appet.2016.05.003
13. Murray DW, Mahadevan M, Gatto K, O'Connor K, Fissinger A, Bailey D, *et al.* Culinary efficacy: an exploratory study of skills, confidence, and healthy cooking competencies among university students. Perspect Public Health. 2016;136(3):143-51. https://doi.org/10.1177%2F1757913915600195

14. Bernardo GL, Jomori MM, Fernandes AC, Colussi CF, Condrasky MD, Costa Proença RP. Nutrition and culinary in the kitchen program: a randomized controlled intervention to promote cooking skills and healthy eating in university students-study protocol. Nutr J. 2017;16(1):83. https://doi.org/10.1186/s12937-017-0305-y

15. Ministério da Saúde (Brasil). Guia Alimentar para a População Brasileira. 2a. ed. Brasília: Ministério; 2014.

16. Belogianni K, Ooms A, Ahmed H, Nikoletou D, Grant R, Makris D, *et al.* Rationale and design of an online educational program using game-based learning to improve nutrition and physical activity outcomes among university students in the United Kingdom. J Ame College Nutr. 2018:1-8. https://doi.org/10.1080/07315724.2018.1476929

17. Monroe JT, Lofgren IE, Sartini BL, Greene GW. The green eating project: web-based intervention to promote environmentally conscious eating behaviours in US university students. Public Health Nutr. 2015;18(13):2368-78. https://doi.org/10.1017/S1368980015002396

18. Leonardi FG, Assumpção RPS. Educação popular na universidade: uma construção a partir das contradições reflexões e vivências a partir do PET Educaçao Popular da Unifesp-Baixada Santista. Rev e-Curriculum. 2016;14(2):437-62.

19. Antunes ÂB, Pini FRO, Gadotti M, Padilha PR. Princípios ecopolítico-pedagógicos da "práxis" freiriana. In: Toledo RF, Rosa TEC, Keinert TM, Cortizo CT, editors. Pesquisa participativa em saúde: vertentes e veredas. São Paulo: Instituto de Saúde; 2018.

20. Habowski AC, Conte E, Jacobi DF. Interlocuções e discursos de legitimação em EaD. Ensaio: Avaliação e Políticas Públicas em Educação. 2020;28:178-97. https://doi.org/10.1590/S0104-40362019002701365

21. Cervato-Mancuso AM, Vincha R, Regina K, Santiago DA. Educação Alimentar e Nutricional como prática de intervenção: reflexão e possibilidades de fortalecimento. Physis. 2016;26(1). https://doi.org/10.1590/S0103-73312016000100013

22. Sallis JF, Owen N. Ecological models of health behavior. In: Glanz K, Rimer V, Viswanath K, editors. Health Behavior and Health Education Theory, Research and Practice. 4th ed. San Fancisco: Jossey-Bass; 2008.

23. Liang W, Duan YP, Shang BR, Wang YP, Hu C, Lippke S. A web-based lifestyle intervention program for Chinese college students: study protocol and baseline characteristics of a randomized placebo-controlled trial. Bmc Public Health. 2019;19(1):1097. https://doi.org/10.1186/s12889-019-7438-1

24. Ghvanidze S, Velikova N, Dodd TH, Oldewage-Theron W. Consumers' environmental and ethical consciousness and the use of the related food products information: the role of perceived consumer effectiveness. Appetite. 2016;107:311-22. https://doi.org/10.1016/j.appet.2016.08.097

25. Wolfson JA, Bostic S, Lahne J, Morgan C, Henley SC, Harvey J, *et al.* A comprehensive approach to understanding cooking behavior: implications for research and practice. Br Food J. 2017;119(5):1147-58. https://doi.org/10.1108/BFJ-09-2016-0438

26. Universidade Federal de São Paulo. Política de Alimentação da Universidade Federal de São Paulo. Aprovada pelo Conselho de Assuntos Estudantis da Pró-Reitoria de Assuntos Estudantis em 08.08.2017. São Paulo: Universidade; 2017 [cited: 2020 Jan. 8]. Available from: https://www.unifesp.br/reitoria/prae/institucional/documentos/politica-de-alimentacao?download=427:politica-de-alimentacao

Received: March 10, 2020
Final version: March 16, 2021
Approved: April 22, 2021