eTECH
TECNOLOGIAS PARA
COMPETITIVIDADE INDUSTRIAL

ISSN
1983-1838
(DOI):10.18624/etech.v16i2.1280

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CONECTA KIDS: EDUCATING CHILDREN ABOUT INDUSTRIALIZED FOOD

CONECTA KIDS: CONSCIENTIZAÇÃO DE CRIANÇAS SOBRE A INDUSTRIALIZAÇÃO DE ALIMENTOS

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Recebido em:24/08/2023
Aprovado em:17/09/2023
Publicado em:25/10/2023

RESUMO

A industrialização de alimentos desempenha um papel essencial para aumentar a disponibilidade de produtos alimentícios e atender às demandas crescentes da população mundial, garantindo a segurança alimentar e diversidade de produtos. Com o intuito de despertar o interesse das crianças sobre a industrialização de alimentos, a turma de segundo período do Curso Superior em Tecnologia em Alimentos, do UniSenai - Campus Chapecó, recebeu a visita de uma escola municipal. A qual contou como atividade avaliativa do componente curricular do Projeto Aplicado I. Preliminarmente, aplicou-se um questionário com o objetivo de identificar a presença de alunos com alergias e/ou intolerâncias alimentares. O evento começou com uma recepção, seguida de uma encenação que retratou a evolução e a importância da industrialização de alimentos. Posteriormente, os alunos da escola participaram de uma atividade prática na qual aprenderam a

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técnica adequada de higienização das mãos. Após isso, conduziu-se um passeio pelos laboratórios didáticos da instituição, onde as crianças puderam observar os equipamentos utilizados no processamento industrial. A etapa seguinte consistiu em um jogo de perguntas e respostas no estilo "passa ou repassa", que tinham o intuito de reforçar os conceitos explicados. Por fim, encerrou-se com uma confraternização entre os participantes. Através dessa atividade, ficou evidente o comprometimento dos acadêmicos e o entusiasmo que demonstraram ao assumirem o protagonismo ao longo do desenvolvimento. Paralelamente, foi perceptível a alegria contagiante e o interesse despertado nas crianças ao explorarem o universo da tecnologia dos alimentos.
Palavras-chave: Alimentos; Conscientização; Industrialização; Acadêmicos; Crianças.

ABSTRACT

Food industrialization plays a vital role in enhancing the availability of food products, catering to the growing demands of the global population, and ensuring food safety and product variety. With the aim of sparking children's interest in food industrialization, the second-period class of the Higher Degree in Food Technology at UniSenai (Campus Chapecó) welcomed a visit from a municipal school. This visit served as an evaluative activity for the curricular component of Applied Project I. Initially, a questionnaire was administered to identify students with food allergies or intolerances. The event commenced with a reception, followed by a performance illustrating the evolution and significance of food industrialization. Subsequently, the school students engaged in a hands-on activity where they were taught the appropriate hand hygiene technique. This was followed by a tour of the institution's educational laboratories, allowing the children to view the equipment used in industrial processing. A "Dare or Double Dare" style Q&A game was then conducted to reinforce the concepts discussed. The event concluded with a gathering among participants. The scholars' dedication and enthusiasm in taking a central role throughout the process were evident. Concurrently, the children's infectious joy and keen interest in exploring the realm of food technology were unmistakable.
Keywords: Food; Awareness; Industrialization; Academics; Children.

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1 INTRODUCTION

As human civilization advanced, there was a transformation in general customs, which inevitably affected dietary patterns. Humans transitioned from being nomadic hunters and gatherers to settled farmers, mastering the art of cultivating vegetables, fruits, and tubers and domesticating animals. After the Industrial Revolution, with women joining the workforce and the urban population surge, there was a marked shift towards increased consumption of industrialized products (KOPRUSZYNSKI and MARIN, 2011).

However, one consequence of industrialization and globalization has been the heightened intake of refined sugars, fats, sodium, and artificial additives such as dyes, sweeteners, and flavorings. This transition has led to diets rich in energy density but deficient in protein, fiber, complex carbohydrates, and micronutrients (CHEN et al., 2020; GARCIA, 2003; LOUZADA et al., 2015). In essence, there has been a significant rise in the consumption of ultra-processed foods. Using the NOVA classification system, foods can be categorized based on their processing levels into four groups:

1. Fresh or minimally processed foods (e.g., fruits, vegetables, milk, meat)
2. Processed culinary ingredients (e.g., sunflower oil, salt, sugar)
3. Processed foods (e.g., bread, jam, cheese)
4. Ultra-processed foods (e.g., sodas, filled cookies, breakfast cereals, fast food).

This last group contributes to weight gain (CHEN et al., 2020; COSTA et al., 2017).

Brazil's nutritional landscape reflects a dietary shift leading to an increase in overweight individuals, chronic non-communicable diseases (like diabetes, cholesterol, cardiovascular ailments), and nutritional deficiencies (DE MELO BARROS et al., 2021; TRICHES and

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SCHNEIDER, 2010). Consequently, the modern Brazilian diet is characterized by an excessive intake of industrialized foods, fats, sugars, and sodium, with a concomitant reduction in cereals, legumes, fruits, and vegetables. This dietary trend correlates directly with the rising incidences of cardiovascular diseases, diabetes, and obesity in Brazil (ANDRADE et al., 2012). Malnutrition, in its current form, significantly contributes to the overall disease burden in Brazil. One effective strategy to combat this is ensuring clear, concise food-related information, facilitating healthier food choices. Access to better information can substantially improve Brazilians' dietary habits and overall health (BRASIL, 2022).

In the past three decades, there has been an escalating emphasis on health and well-being, with consumers increasingly seeking fresh, flavorsome, and sustainable foods with a reduced environmental footprint. Responding to this trend, the food industry has been introducing cutting-edge technologies for nutrient preservation during processing (KNORR, AUGUSTIN, 2021). Moreover, this rising demand for healthier foods has propelled the industry to substitute synthetic additives with natural alternatives (FAUSTINO et al., 2019).

Recognizing the implications for future generations, governments are intensifying their efforts in establishing school feeding programs. These initiatives underscore the significance of consuming fresh foods from a young age. Simultaneously, such programs motivate small-scale farmers to maintain pesticide-free agricultural practices, further bolstering this segment of the economy (TRICHES; SCHNEIDER, 2010).

Freitas and Gonçalves (2020) argue that schools foster better health and instill healthy eating habits. Schools not only champion the intake of health-enhancing foods but also, through hands-on activities, facilitate profound learning experiences. Given the school environment's profound influence on students' dietary preferences, it is seen as the optimal venue for rolling out

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educational programs. These programs, in turn, aid in establishing and reinforcing healthy eating patterns, ramifications of which echo in the familial setting, thus positioning food as a potent pedagogical tool (OLIVEIRA et al., 2014).

When children have concrete experiences, they are able to make connections between abstract elements and everyday situations. Such immersion amplifies their subject interest and concurrently nurtures their cognitive and social faculties holistically (MOREIRA, 2011). Therefore, imparting knowledge about food technology and composition through lab visits, interactive activities, and games proves exceptionally effective for children. Such immersive methods cater to their innate curiosity and enhance their comprehension. In this context, this Applied Project aimed to promote an activity that would introduce and arouse the curiosity of elementary school children in Food Technology and emphasize the importance of hand hygiene before meals and when handling food.

2 MATERIAL AND METHODS

The selected venue for the food-centric event was the Clara Urmann Municipal Elementary School, located near UniSenai. In the event were sixty pupils, aged 8 and 9, currently enrolled in the second and third years of elementary education. This event was organized as a part of the evaluation for the “Applied Project I” curriculum component of the second semester in the Higher Degree in Food Technology program at UniSENAI - Campus Chapecó/SC.

The preparatory phase for the event kicked off in the classroom, where students delved into a bibliographical study on the evolution of food industrialization. This research aimed to grasp the historical progression, the surge in industrial food production, and the resultant shifts in consumer

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behavior. Following this research, an activity schedule was crafted focusing on the historical milestones in food industrialization and prompting reflections on its significance. These foundational stages equipped the students with the requisite knowledge to spearhead the subsequent phases of the project.

A brainstorming session was held with the students to craft a questionnaire for the participating children. This collaborative approach identified and selected pertinent questions, encompassing topics like dietary restrictions and the children's preferred foods (Figure 1). Once finished, the questionnaire was printed and entrusted to the school's pedagogical coordinator, responsible for disseminating it to the parents or guardians of the participating children.

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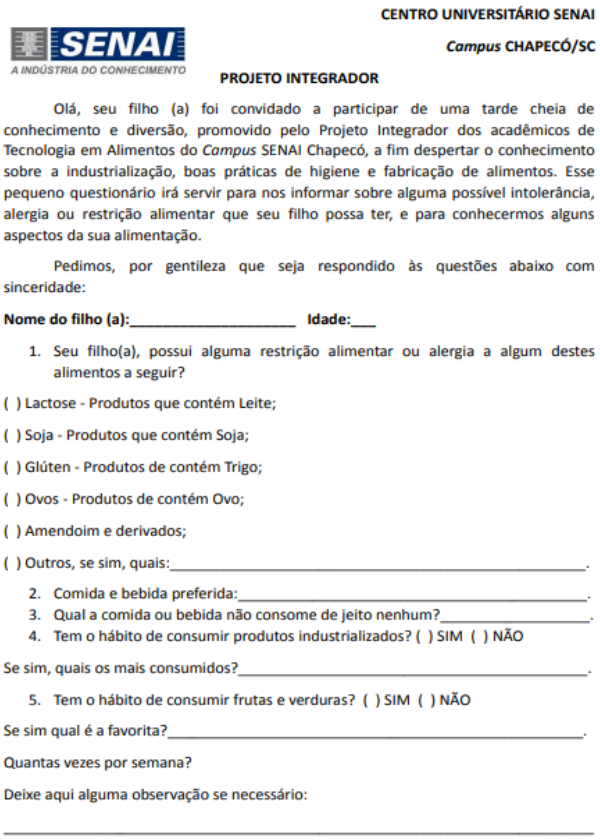
Figure 1: The children's data collection form



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SENAI
A INDÚSTRIA DO CONHECIMENTO

PROJETO INTEGRADOR

Olá, seu filho (a) foi convidado a participar de uma tarde cheia de conhecimento e diversão, promovido pelo Projeto Integrador dos acadêmicos de Tecnologia em Alimentos do *Campus* SENAI Chapecó, a fim despertar o conhecimento sobre a industrialização, boas práticas de higiene e fabricação de alimentos. Esse pequeno questionário irá servir para nos informar sobre alguma possível intolerância, alergia ou restrição alimentar que seu filho possa ter, e para conhecermos alguns aspectos da sua alimentação.

Pedimos, por gentileza que seja respondido às questões abaixo com sinceridade:

Nome do filho (a):_____ **Idade:**___

1. Seu filho(a), possui alguma restrição alimentar ou alergia a algum destes alimentos a seguir?

( ) Lactose - Produtos que contém Leite;

( ) Soja - Produtos que contém Soja;

( ) Glúten - Produtos de contém Trigo;

( ) Ovos - Produtos de contém Ovo;

( ) Amendoim e derivados;

( ) Outros, se sim, quais:_____.

2. Comida e bebida preferida:_____.
3. Qual a comida ou bebida não consome de jeito nenhum?_____.
4. Tem o hábito de consumir produtos industrializados? ( ) SIM ( ) NÃO

Se sim, quais os mais consumidos?_____.

5. Tem o hábito de consumir frutas e verduras? ( ) SIM ( ) NÃO

Se sim qual é a favorita?_____.

Quantas vezes por semana?

Deixe aqui alguma observação se necessário:

_____

Source: From the author (2022)

From the feedback gathered from the forms, the dietary restrictions and preferences of the children were identified. Based on this information, the university students decided on the menu for

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the get-together scheduled on the event day. Collaborations were forged with a supplement company based in Xaxim (Santa Catarina State), which generously donated protein bars with and without added sugars. Additionally, partnerships were established with benefactors in Chapecó (Santa Catarina State), who contributed fruits for a fruit salad and ingredients for sandwiches.

Beyond just catering to dietary needs, the university students were tasked with devising engaging games and activities for the day of the event. The primary objective behind these activities was to educate the children about vital topics such as hand hygiene while also sparking their curiosity about food and its various aspects. Keeping this goal in mind, a game titled “Dare or Double Dare” was conceptualized (Figure 2). For this game, the students handpicked nine pertinent questions, which the children would need to answer during the gameplay.

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Figure 2: Questions from the “Dare or double Dare” game

1. Para ter uma Alimentação Saudável as refeições deve ser:
a. Desequilibradas, variadas e completas, com doces e refrigerante
b. Completas, equilibradas e variadas, com todos os nutrientes
c. Variadas, em excesso e completas, com frituras

2. Qual dessas bebidas contém maior quantidade de açúcar?
a. Leite
b. Suco de Laranja Natural
c. Refrigerantes

3. Quais desses grupos de alimentos são ricos em vitaminas?
a. Banana, Manga e Maçã
b. Carne, Ovos e leite
c. Sorvete, bala e salgadinho

4. O tomate é um legume ou uma fruta?
a. Fruta
b. Legume
c. Tubérculo

5. De qual fruta é produzido o chocolate? Resposta: do cacau.
a. Banana
b. Cacau
c. Maçã

6. Qual dessas frutas é rica em vitamina C?
a. Pera
b. Maçã
c. Laranja

7. Quais desses grupos de alimentos são processados
a. Suco de abacaxi em pó, Sorvete de chocolate, Salgadinho de Presunto
b. Maçã, banana e milho verde
c. Banana, salsicha, alface

8. Quais desses grupos de alimentos são alimentos naturais
a. Banana, salsicha, alface
b. Banana, tomate, alface
c. Hambúrguer, suco de abacaxi em pó e sorvete de chocolate

9. Patricia quer manter uma alimentação balanceada e saudável, para que isso ocorra Patrícia deve consumir diariamente:
a. frutas e verduras.
b. sorvete e picolé cremosos
c. bolachas recheadas industrializadas

Source: From the author (2022)

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The students explained how hand washing should be carried out and its importance for maintaining good health, especially before meals and when handling food. They then invited five children to practice washing their hands in the microbiology laboratory. To do this, they prepared liquid soap with invisible ink for black light, which the children used for mechanical scrubbing, following the steps taught by one of the academics. After rinsing with running water and drying with a paper towel, a black light was placed near the hands and forearms to identify the invisible ink marks that remained, thus making an analogy that microorganisms cannot be seen either, but they live with us, and others can transmit diseases.

The children were taken on a tour of the Technology laboratories. Guided by the university students, they were introduced to the core equipment and the intricate processes behind the production of various food items such as salami, cheese, yogurt, ice cream, and others.

3 RESULTS AND DISCUSSION

3.1 Preparing for the event

Out of the 60 questionnaires sent to the children's guardians, there was a response rate of 72%, revealing a variety of dietary preferences. However, 28% of the questionnaires were not returned by the stipulated deadline. Additionally, it was found that five children (8%) had dietary restrictions, including cases of Type I diabetes, lactose intolerance, egg allergy, soy allergy, and milk allergy.

Although the questionnaire was designed to be straightforward and the school emphasized the importance of accurate participation and return of the forms, it can be inferred that the

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remaining 28% may not adequately monitor their children's school activities and tasks. Alternatively, there might have been a lack of interest in responding. Based on the dietary characteristics of each child, the students prepared foods aiming for a balanced and healthy meal, including allergen-free foods for children with dietary restrictions. Consequently, the university students prepared the following foods to be served during the gathering: gummy candies, sandwiches, fruit salad, and pure orange juice. Cereal bars, both with and without sugar, were also provided and donated by the partnering company. The gummy candies were also produced in sugar-free versions to cater to the young audience (Figure 3). These candies were distributed to the children to take home as a token of appreciation for their participation.

Figure 3: Students making gummy candies

Source: From the author (2022)

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The sandwiches and fruit salads were prepared the night before the visit. Sandwiches were made from bread with cottage cheese, ham, and cheese (Figure 4).

Figure 4: Students preparing fruit salad and sandwiches.

Source: From the author (2022)

3.2 Holding the event

The event was held on October 27, 2022 (Figure 5). Initially, the children and their teachers were greeted in the UniSENAI auditorium, where the significance and evolution of the food industry were discussed. During this session, the children interacted with the university students, engaging in discussions about past eras and how they envisioned the lives of their forebears, for instance, living without the convenience of refrigerators. They also shared experiences related to having gardens at home, cultivating vegetables and fruits, and even milking cows. This exchange enabled

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the university students to build a deeper rapport with the children, motivating them to actively participate in the conversation.

Figure 5: Reception of the children by the Food Technology students

Source: From the author (2022)

After the initial reception, the students embarked on a guided tour of the campus, designed to introduce them to the academic environments: the microbiology and chemistry laboratories and the food technology laboratory. Educational and recreational activities were set up in each of these spaces. In the chemistry laboratory, participants were divided into two groups to engage in an interactive game named “Dare or Double Dare.” This activity posed questions that encouraged

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children to discuss their understanding of the consumption of processed, ultra-processed, and natural foods.

The subsequent destination, the microbiology laboratory, provided an insight into the significance of Good Manufacturing Practices (GMP) in food production. After all, the primary objective of GMP is to ensure the production of food devoid of any contaminants, whether physical (e.g., hair or wood fragments), chemical (residues of detergents or pesticides), or biological (such as bacteria or fungi). This segment enlightened the children about the meticulous processes ensuring the safety of the food they consume.

Five children were randomly chosen to participate in a practical demonstration of proper hand hygiene. For this, colorless fluorescent paint was blended with liquid soap, which was imperceptible to the children. After they washed their hands, the lights were turned off, and a black light was used to highlight areas where the paint—symbolizing germs—remained. This vividly illustrated the importance of thorough hand-washing and how microorganisms persist even after comprehensive cleaning (Figure 6). The children's astonishment and subsequent contributions were notable.

Similar reactions were documented by Bernart and Zanardo (2011), who executed nutritional education activities for children from two public schools in the municipality of Erechim/RS. They observed the children's keen interest in sharing their desires, experiences, and dietary patterns. They actively engaged by asking questions, sharing insights, and proposing suggestions.

Silva (2019), in his work emphasizing the pedagogical value of field visits, argued that such experiences can offer knowledge in areas that might be overlooked in typical classroom settings. By facilitating direct engagement with contemporary research and specialized knowledge domains,

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students get a glimpse into concepts, knowledge areas, and even potential career paths they might not have been exposed to previously.

Figure 6: Blacklight to check fluorescent light residues

Source: From the author (2022)

Hand hygiene is paramount, especially before meals and when handling food. The school environment, being densely populated, is conducive to the rapid spread of diseases due to close interpersonal contact, frequent hand-to-mouth actions, and occasional lapses in hygiene practices. Proper hand-washing is crucial in mitigating the spread of pathogens, including bacteria and viruses.

Schools are central to social interactions. With the backdrop of inadequate hand hygiene practices, they can become hotspots for infection transmission, underscoring a pressing public and community health challenge. Echoing this sentiment, Martins et al. (2022) devised an interactive activity using paints, followed by a demonstration of the correct hand-washing technique. Similar to

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our study, they believed such initiatives could curtail disease spread and foster awareness among the broader community as students share their newfound knowledge with family and friends.

Additionally, our students prepared microscope slides showcasing human hair samples and insect fragments (Figure 7). This exercise aimed to underscore the potential hazards in food and accentuate the significance of GMP. While industries may adhere to best practices, certain foods, like insect fragments, could inadvertently contain foreign matter. This is occasionally permissible by regulations, contingent on the specific product and its production process. For instance, tomato sauce might contain trace amounts of such materials.

Figure 7: Children viewing the prepared slides using the microscope

Source: From the author (2022)

Following the hands-on lab experience, the children were ushered to the campus library, engaging in a photo session aligned with the monthly Halloween theme. They were introduced to an array of books and games, showcasing the library's vast resources available to both campus affiliates and visitors. The next stop was the food laboratory. Here, the students delved into the

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practical components of their Food Technology course, fostering an appreciation for food quality and safety in the children. This was an effort to shift the children's focus from mere commercial branding and transient food trends to understanding the essence of what they consume. The interactive session was interactive, with children eagerly posing questions and sharing their food experiences. The discussion underscored the nutritional dichotomy within industrialized foods, emphasizing consumers' need for informed choices.

The day's activities culminated in a hearty snack of sandwiches, fruit salad, and freshly squeezed orange juice. As the children savored their snacks, it was a moment of bonding and exchange, with the children interacting with the students, expressing gratitude, and sharing their individual experiences. The children's reactions to the food offered insights into their dietary inclinations. For instance, the reluctance of some children to try the fruit salad indicated a lack of exposure to fruits in their regular diets.

The student participants reflected on the event with a sense of accomplishment. They had not only shared their academic learnings but also witnessed their positive influence on the young minds, hopeful that these lessons would resonate in the children's homes. Echoing this sentiment, Giassi et al. (2022) emphasized universities' pivotal role in research, knowledge generation, and student education. Extension projects, such as this one, bridge the gap between academia and society, facilitating the flow of knowledge, fostering mutual growth, and strengthening the bond between institutions and the communities they serve (GIASSI et al., 2022).

4 CONCLUSION

Through the applied project, we observed that examples deeply influence children, often referencing specific situations from their family routines. The diversity of their backgrounds was

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evident, demonstrating varied interpretations of even simple actions like hand washing. The students' use of invisible ink during the hand-washing activity was particularly effective, captivating the children's attention and instilling enthusiasm for learning about the unseen microbial world. During the group snack, the children actively discussed the day's activities, showing significant interest and excitement about their learning. This project also highlighted the food industry's vital role in society, emphasizing that there would not be enough food for everyone. For the student participants, the project was both an opportunity to share classroom-acquired knowledge and a chance to connect emotionally with the children, especially when observing their reactions to the food.

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TECNOLOGIAS PARA
COMPETITIVIDADE INDUSTRIAL

ISSN
1983-1838
(DOI):10.18624/etech.v16i2.1280

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