MOBILE APPLICATION FOR UNDERSTANDING NUTRITIONAL LABELING FOCUSED ON THE CONSUMER

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ABSTRACT

Objective: In this multidisciplinary study, a mobile application was designed as a technological tool that contributes to the training of informed consumers capable of interpreting the nutritional characteristics of the products they purchase.

Theoretical Framework: Mobile applications that allow to display the sodium, sugar and fat content of a product in a way that is understandable to the consumer. Additionally, an area of opportunity is evident in the way of presenting this information and in the calculation of daily energy content.

Design/Methodology/Approach: The agile Scrum methodology was used. The requirements of the mobile application were obtained through user stories, which allowed two sprints to be done. The application was subjected to unit and integration testing, connectivity and functionality type.

Findings: Mobile application for users of the Android operating system that allows you to read, through a smartphone, the barcode of a product on the front labeling and display the sugar, sodium and fat content; Moreover, it issues recommendations for their consumption in accordance with the FAO, WHO, UNU.

Research, Practical & Social Implications: Contributes to the training of informed consumers capable of having a better interpretation of the nutritional characteristics of the products they purchase.

Originality/Value: Mobile application that to scan the barcode of a product and graphically display, through teaspoons, the content in grams of sodium, sugar and calories it contains. Moreover, it calculates the daily energy content according to some variables: sex, age, weight and level of physical activity.

Keywords: Mobile App, Obesity, Nutritional Labeling

APLICAÇÃO MÓVEL PARA ENTENDER A ROTULAGEM NUTRICIONAL FOCADA NO CONSUMIDOR

RESUMO

Objetivo: No presente estudo multidisciplinar se desenvolveu um aplicativo para um dispositivo móvel que contribua para a formação de consumidores informados capazes de interpretar as características nutricionais dos produtos que adquirirem.

Referencial Teórico: Aplicativos móveis que permitem mostrar o conteúdo de sódio, açúcar e gordura de um produto de maneira compreensível para o consumidor. Adicionalmente, evidenciou uma área de oportunidade na forma de apresentação da referida informação e no cálculo do conteúdo energético diário.

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**Desenho/Metodologia/Abordagem:** Se utilizou a metodologia ágil Scrum. Os requisitos se obtiveram através dos históricos do usuário e da realização dos sprints. A aplicação às vezes teve testes unitários e de integração; o tipo de conectividade e funcionalidade.

**Resultados:** Aplicativo móvel para usuários do sistema operacional Android que permite ler, através de um telefone inteligente, o código de barras de um produto da etiqueta frontal e mostrar o conteúdo de açúcar, sódio e gordura; assim como, emitir recomendações para o consumo dos mesmos acordos com a FAO, OMS e UNU.

**Investigação, Implicações Práticas e Sociais:** Contribui para a formação de consumidores informados capazes de ter uma melhor interpretação das características nutricionais dos produtos que adquirem.

**Originalidade/Valor:** Aplicativo mobile que permite escanear o código de barras de um produto e a amostra da forma gráfica através das colheres de chá, do conteúdo em gramas de sódio, açúcar e calorias que contém. Além disso, calcule o conteúdo energético diário de acordo com algumas variáveis: sexo, idade, peso e nível de atividade física.

**Palavras-chave:** Aplicativo Móvel, Obesidade, Rotulagem Nutricional.

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**APLICACIÓN MÓVIL PARA LA COMPRENSIÓN DEL ETIQUETADO NUTRIMENTAL ENFOCADA AL CONSUMIDOR**

**RESUMEN**

**Objetivo:** En el presente estudio multidisciplinario se diseñó una aplicación móvil como una herramienta tecnológica que contribuya a la formación de consumidores informados capaces de interpretar las características nutricionales de los productos que adquieren.

**Marco Teórico:** Aplicaciones móviles que permiten mostrar el contenido de sodio, azúcar y grasa de un producto de manera entendible para el consumidor. Adicionalmente se evidencia un área de oportunidad en la manera de presentar dicha información y en el cálculo de contenido energético diario.

**Diseño/Metodología/Enfoque:** Se utilizó la metodología ágil Scrum. Los requerimientos se obtuvieron a través de historias de usuario y se realizaron dos sprints. La aplicación fue sometida a pruebas unitarias y de integración; de tipo conectividad y funcionalidad.

**Resultados:** Aplicación móvil para usuarios del sistema operativo Android que permite leer a través de un teléfono inteligente, el código de barras de un producto del etiquetado frontal y mostrar el contenido de azúcar, sodio y grasa; así mismo, emite recomendaciones para el consumo de los mismos de acuerdo con la FAO, OMS y UNU.

**Investigación, Implicaciones Prácticas y Sociales:** Contribuye a la formación de consumidores informados capaces de tener una mejor interpretación de las características nutricionales de los productos que adquieren.

**Originalidad/Valor:** Aplicación móvil que posibilita escanear el código de barras de un producto y muestra de manera gráfica a través de cucharaditas el contenido en gramos de sodio, azúcar y calorías que contiene. Además, calcula el contenido energético diario de acuerdo con algunas variables: sexo, edad, peso y nivel de actividad física.

**Palabras clave:** Aplicación Móvil, Obesidad, Etiquetado Nutricional.

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1 INTRODUCTION

The World Health Organization (WHO), places Mexico in the 27th place among the countries with the most obesity in the world (para. 6), and the sixth place with the most obesity, within the countries that make up the Organization for Economic Cooperation and Development (Wisevoter, 2023, para. 10).

According to the results of the National Health and Nutrition Survey (ENSANUT) applied in Mexico in 2022, overweight and obesity in children between 5 and 11 years old was 37.3%; in adolescents between 12 and 19 years old the percentage was 41.1%; in people over 20 years old it was 75.2%; and in adults between 40 and 60 years old, 85% (SA, National Institute of Public Health and Evaluation and Survey Research Center, 2023, p.42.45).

Regarding the levels of physical activity and sedentary lifestyle, they showed that 40.5% of children and 13% of adolescents do not comply with the recommendation issued by the WHO, which consists of doing at least 60 minutes a day on average of moderate physical activity. - vigorous, four to seven days a week (Medina, Jáuregui, Hernández, González, Olvera, Blas, Campos and Barquera , 2023, p.S264).

Childhood overweight and obesity can persist into adulthood, resulting in increased lifetime costs, including obesity-related comorbidities and treatments (Ling, Chen, Zahry, & Kao, 2022, p.12).

The government budget approved in Mexico for the year 2023 related to the care of diseases derived from this problem was 601 billion pesos annually (Mexican Institute for Competitiveness, 2022, p.3).

There are behavioral factors associated with an increased risk of childhood obesity, including: increased screen time, short sleep duration and poor sleep quality, reductions in physical activity, and increased intake of energy-rich, carbohydrate-poor foods. micronutrients, the loss of walkable green spaces in many urban environments, the increase in motorized transportation, rapid changes in the use of technology and the shift away from traditional foods towards ultra-processed foods (Lister, Baur, Felix, Hill, Marcus , Reinehr, Summerbell, & Wabitsch, 2023, p. 4).

In this regard, the federal government in 2013 implemented the National Strategy for the Prevention and Control of Overweight, Obesity and Diabetes, which states: “to train informed consumers capable of interpreting the nutritional characteristics of the products they purchase” (SA, 2013a, p.64). Consequently, in July 2015, the new front labeling for foods and non-alcoholic beverages in Mexico was implemented, with the objective of informing the
consumer about the nutritional content and energy contribution of pre-packaged foods and non-alcoholic beverages, graphically in the front product display area, in accordance with NOM-051-SCFI/SSA-2010 (SA, 2016, p. 5).

However, according to Nieto, Alcalde-Rabanal, Mena, Carriedo and Barquera (2020, p. 292) when conducting a study in 12 cities in Mexico and highlighted several problems in interpreting nutritional labeling. These included the technicalities of the terms used, the format, the percentages and partial understanding of the labeling. Technical information proved to be a barrier to use and understanding (2020, p. 295).

In this sense, the development of the Label Translator mobile application will allow the consumer to obtain nutritional information from commercial brands in a simple way through easy-to-understand graphics; in addition to knowing in a personalized way your daily energy requirements and the percentage of sugar, sodium and fat that according to the recommendations of the Food and Agriculture Organization of The United Nations, World Health Organization and United Nations University (FAO, WHO and UNU).

2 CONCEPTUAL FRAMEWORK

2.1 USE OF THE INTERNET AND MOBILE APPLICATIONS (APPS)

Facts and Figures from the International Telecommunication Union (ITU) show that almost three quarters of the world's population aged 10 and over had a mobile phone in 2022 (2022). According to the National Survey on Availability and Use of Information Technologies in Homes (ENDUTIH) applied by the National Institute of Statistics and Geography (INEGI), it shows that cellular technology in Mexico in 2022 there were 93.8 million users, 8.3 million more than in 2019. The population of six years or older, who uses cell phones, went from 74.9 to 79.2 percent, which represented an increase of 4.3 percentage points between 2019 and 2022 (INEGI, 2023, p. 12). 94.6 percent are smartphone users, 5.2 percent are users of a common cell phone and 0.2 percent use both devices (INEGI, 2023, p. 13).

Mobile applications or Apps are programs adapted to the characteristics of smartphones or tablets and allow us to cover almost any user need in the digital field, through online download (Mascarell-Palau, 2021, p. 82). They were created to make life easier for users and support their mobility so that they can effortlessly perform their daily tasks anywhere (Radhiyya and Kusumawati, 2023, p.46), this due to their ubiquity (Mascarell-Palau, 2021, p. 82.)
The annual number of global app downloads in 2023 will be around 299 billion (it User Tech & Business, 2023). “Combined, Apple's App Store and Google's Play Store have between 35,000 and 36,000 million app downloads each quarter” (Statista cited in MobiLoud, 2023). They dominate gaming, with nearly 100 billion downloads a year. In second place are photo and video mobile applications, with almost 20 billion downloads. The most downloaded Apps in the world in 2022 were TikTok, Instagram, Facebook, WhatsApp and Snapchat, in that order (Statista cited in MobiLoud, 2023).

2.2 HEALTH APPS

Health Apps are Apps that promote health and primary disease prevention. They can help people with chronic diseases manage their medical conditions or improve adherence to treatment (Maaß, Freye, Pan, Dassow, Niess and Jahnel, 2022, p. 2).

The result of a global cross-sectional study carried out during the pandemic on the use of Apps, in which 552 adults from 32 countries (mostly Australian) participated, revealed that 60% of adults used a mobile App for reasons related to health, while 38% used Apps to track their physical activity. 83% of people responded that they used health apps during the pandemic to stay active; 37% to connect with other people, 33% to manage their mental health, 26% to eat healthy and 26% to sleep better (Tong, Maher, Parker, Dung, Neves, Riordan, Chow, Laranjo and Quiroz, 2022, p.6).

At the national level, Apps related to the topic of health grew by 115%, going from 265 million minutes of consumption in January 2020 to 571 million minutes in July 2021 (Amarilio, 2022).

2.3 NOM-051-SCFI/SSA-2010

The Official Mexican Standard NOM-051-SCFI/SSA-2010 includes, among others, the following obligations: show the caloric intake by nutritional source: saturated fat, other fats, sodium, total sugars and energy (SA, 2016, p. 7), based on the percentage of daily nutrients based on a caloric diet of 2,000 calories and presenting the total calories that the products contain per container and/or per portion (SA, 2016, p.12).

This rule has been modified on two occasions. In the first modification, reference is made to the front labeling, which in addition to including seals and precautionary legends; The inclusion of children’s characters, animations, cartoons, celebrities, athletes, pets, among others,
is prohibited. Likewise, it prohibits healthy claims regarding the critical nutrients for which the seal was imposed. The last modification came into force on October 1, 2023 and refers to displaying mandatory information about (The Food Tech, 2023) in a clear, visible and legible manner on the label:

- List of ingredients, in descending order by weight; In addition, ingredients that are considered added must be marked with an asterisk and a brief description of each ingredient must be provided.
- List of nutrients in table form and proportional to serving size with energy value, carbohydrates, fats, proteins, fibers, sodium, sugar and added sugars.
- **Allergens** present in foods marked with a specific symbol and with a brief description of each allergen.

### 2.4 STATE OF THE ART

In Argentina, an App called How to Balance was launched in 2017, which works as a nutritional translator in accordance with national and international organizations and food guides. It allows labeling information to be translated into simple terms and detects ultra-processed foods and critical nutrients by reading the barcode on the front labeling placed on food products. Enables search and comparison between products (Infocielo, 2021).

In the same year, in Mexico, an App called Nutritional Scanner was made available, available for IOS; which makes it possible to read the product's barcode and shows the number of stamps corresponding to the amount of sugars, saturated fats, sodium and calories contained in the product and a general message about its consumption (El Economista, 2017).

There are other similar applications: Yuka, MyRealFood and El CoCo, which also scan the barcode of a food product and indicate the amounts of sodium, sugar and calories; With the Yuka App you can see more details of the food, MyRealFood has healthy food recipes and CoCo assigns a score to the scanned product according to the Chilean front labeling and other International guides (thirteen, 2021).

Although there are Apps that scan the barcode of food products and show their ingredients; The proposed App presents the number of grams of sugar, sodium and fat through teaspoons, which allows for a simpler way of interpretation. It makes it possible to add new products that are not in the database and calculates the amount of daily caloric energy requirements according to your sex, age, weight and level of physical activity.
3 METHODOLOGY

For the development of the Tag Translator App, Scrum was chosen as an agile and iterative methodology (Ballesteros, 2021, p.129), since it allows the development of computer projects based on communication, integrated and collaborative work; and in learning by doing (Hidalgo, 2019, p.5); It enables the development of collaborative projects with few members and in a short time in a simple and dynamic way (Hidalgo, 2019, p.5). This methodology has five stages (Huss, Herber, and Borky, 2023, p.235):

1) Initiation; in which the project stakeholders were identified, the Scrum Master (leader) was appointed and two specific project objectives were established:
   a) Develop a module that allows you to read the barcode of a product on the front label using a smartphone and display the sugar, sodium and fat content of the product, to keep the App user informed.
   b) Develop a module that issues recommendations to the App user for the consumption of sugar, sodium and fat according to some variables such as: sex, age, weight and level of physical activity.
   c) Carry out tests on the App to detect and address errors in a timely manner.
2) Planning and estimation. According to Lucero and La Serna (2018, p. 61), for Scrum the requirements are collected through User Stories (UX), so two UX were created ordered by delivery priority: 1) Information and 2) Personalization. Each UX corresponds to the number of iterations (sprint) that were carried out, with the UX called Information, the first deliverable; Subsequently, interface prototypes were designed.
3) Implementation; The first deliverable related to the first sprint was created and new functionalities that had not been contemplated in the first instance were added.
4) Review and retrospective. The first UX was compared to the desired goal and feedback was provided.
5) Launch or closure. The tests of the first block of the App were carried out and the requested changes were verified.

Once the first UX was completed, we continued with the UX called Personalization and iterated again.

The software tools used were: MySQL for storing product information; Android Studio as a mobile programming language; XAMPP as a local cross-platform server. All these tools are free license. The Zxing Android Embedded library was used, which allows Android applications to read various types of codes, including barcodes.
The first UX of the Nutritional Label Translator App contemplated the following requirements:

1) Read the barcode of products that have front labeling.

2) Deploy an interface that graphically indicates to the user (using the image of a teaspoon) the sugar, sodium and fat content of the product.

3) If the product is not found in the database, the user can capture the necessary information to obtain the previous result.

4) The captured information is stored in the database.

For the second UX, the following were considered:

1) Ask the user to indicate their sex, age, weight and level of physical activity.

2) Calculate daily caloric energy requirements, and

3) Personal recommendations for sugar, sodium and fat consumption

4) Read the product barcode

5) Show, based on the recommendations of the FAO, WHO and UNU, the percentage that the product represents in your daily consumption.

To satisfy the above requirements, it was necessary to consider the following:

The energy requirement of a person according to NOM-043-SSA2-2012, in item 3.28, is related to their energy expenditure (EG) and is defined as the energy consumed by an organism, it is represented by the basal metabolic rate (BMR), physical activity (PAL) and diet-induced thermogenesis (DID) (SA, 2013b, p. 28).

3.4 CALCULATION OF BASAL METABOLISM (BMR)

The values indicated by the FAO, WHO and UNU to obtain basal metabolism are:

The level of physical activity is described as the ratio between Total Energy Expenditure and Basal Metabolism and is used to determine the amount and intensity of an individual's usual physical activity (FAO, WHO and UNU, 2004). The values for basal metabolism can be seen in Table 1.

<table>
<thead>
<tr>
<th>Age/Years</th>
<th>BMR:KCAL/DAY</th>
<th>Age/Years</th>
<th>BMR:KCAL/DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;3</td>
<td>59,512 Kg-30.4</td>
<td>&lt;3</td>
<td>58,317 Kg-31.1</td>
</tr>
<tr>
<td>3-10</td>
<td>22,706 Kg+504.3</td>
<td>3-10</td>
<td>20,315 Kg+485.9</td>
</tr>
</tbody>
</table>

Table 1
Basal metabolism values
3.5 USER PHYSICAL ACTIVITY LEVEL (PAL)

The FAO, WHO and UNU describe the following lifestyles related to physical activity: i) sedentary lifestyles, ii) active or moderately active lifestyles, iii) vigorous or energetically active lifestyles. Table 2 shows the category of physical activity and its respective value.

Table 2

<table>
<thead>
<tr>
<th>Category</th>
<th>PAL value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedentary or light activity lifestyle</td>
<td>1.40-1.69</td>
</tr>
<tr>
<td>Active or moderately active lifestyle</td>
<td>1.70-1.99</td>
</tr>
<tr>
<td>Vigorous or vigorously active lifestyle</td>
<td>2.00-2.40</td>
</tr>
</tbody>
</table>

Source: Taken from FAO, WHO and UNU

3.6 THERMAL EFFECT OF FOOD

The result obtained in the previous step is multiplied by 10 percent, which is the Thermal Effect of Food, that is, the energy expenditure that occurs in the processes of food consumption (Tian, Cao, Huan, Gong, Yuan, Chen, Hu and Shi, 2023, p. 585).

3.7 DETERMINING HEALTHY LEVELS OF SUGAR, SODIUM AND FAT CONSUMPTION

According to the WHO, sodium consumption for children and adults indicates that the maximum recommended daily intake of sodium is 2 grams (Pan American Health Organization, 2021, p.1), as well as the healthy level of daily sugar consumption. a maximum of 10% of daily calories.
3.8 DETERMINATION OF THE PERCENTAGE OF DAILY REQUIREMENT REPRESENTED BY THE PRODUCT

With the above information, the user can know the percentage of sugar, sodium and fat that the product they are about to consume represents their daily requirements.

Both UXs are shown graphically in Figure 1.

**Figure 1**

*UX that make up the App, according to Scrum*

![UX Diagram](image)

4 RESULTS

The Label Translator mobile application was developed as a technological tool that contributes to the training of informed consumers capable of interpreting the nutritional characteristics of the products they purchase (United Nations Children's Fund [UNICEF], 2023, p.3) making it easier for them to understand the new “front labeling for food and non-alcoholic beverages in Mexico.”

This multidisciplinary work was developed by the Academic Body of Marketing and Technological Innovation of the Polytechnic University of Tulancingo, in conjunction with the Information Technology Educational Program of the Technological University of Valle del Mezquital, both institutions located in the state of Hidalgo; which allowed the training of human resources in the area of Computer Systems engineering at the Polytechnic University of Hidalgo.
Tulancingo, in which a team of students collaborated with the development of the application over a period of seven months.

The target market for the Label Translator was initially defined as men or women interested in their health or who have problems with overweight, obesity, diabetes and hypertension who require knowledge of the nutritional content of the products they consume and who have a smartphone with Android operating system.

The result is a mobile application that allows the user to:

i) Read a barcode of a product using the smartphone camera and know its name, its image and graphically (using teaspoons) the sugar, sodium, fat and calorie content that the product contains; If the product is not found in the database, the user adds its information.

Figure 2 shows the deployment of the Label Translator App on a mobile device with captured product and display of nutritional information.

ii) Personalize daily nutritional requirements according to age, sex and level of physical activity, to maintain the bodily functions of the human organism directed towards optimal health and performance (Ronsería-Rodríguez, Bejarano-Roncancio, Medina-Parra, Merchán-Chaverra and Cuéllar-Fernández, 2022, p. 269) ; as well as, identify what percentage of your daily requirements the product you are about to consume contains using as a reference the values issued by the FAO, WHO and UNU (2004) in the Human Energy Requirements compendium. Figure 3 shows evidence of this module.

The Label Translator App was subjected to unit tests of: connectivity and functionality; as well as integration tests. Unit tests allowed us to find errors in a modular way, and then make the appropriate changes. The integration tests allowed us to verify the correct functioning of both modules, which integrate the App as a whole. The reading of the barcode was independently verified through the camera of the smart cell phone with Wifi connectivity and through data, and the results were positive.

Subsequently, functionality tests were carried out on both modules, which allowed verifying the functions that the App must perform based on the requirements and specifications that were established in the two UX. These tests were documented in the test cases (Table 3) and in the test logs, they were followed up until it was demonstrated that there were no longer any errors (Table 4).
Figure 2
Label Translator App viewed on mobile device with captured product and nutritional information

Source: Own elaboration based on the Label Translator App

Figure 3
Mobile device screen with module for customization

Source: Own elaboration based on the Label Translator App
Table 3

Test cases

<table>
<thead>
<tr>
<th>Test Case Id:</th>
<th>TE-M-v01</th>
<th>Tester:</th>
<th>Yolanda Marysol Escorza Sánchez</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td>08/10/2021</td>
<td>Around:</td>
<td>Mobile</td>
</tr>
<tr>
<td>System:</td>
<td>Tag Translator</td>
<td>Database:</td>
<td>BD_translator</td>
</tr>
<tr>
<td>Version:</td>
<td>2.0</td>
<td>Cycle:</td>
<td>No</td>
</tr>
<tr>
<td>Revision:</td>
<td>1</td>
<td>Screen/Module/Use Case</td>
<td>Information</td>
</tr>
<tr>
<td>Type of test:</td>
<td>Unitary Connectivity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test Objective:
Verify that reading the barcode through the camera of the smart cell phone with Wi-Fi connectivity and through data works correctly.

Test prerequisites:
- Have a connection to the Wi-Fi network.
- Have mobile data on your smartphone.
- Have an edible product that contains a barcode.
- Have a smart mobile phone with Android operating system and camera.
- Have the Label Translator App installed.

Procedure:
For Wifi network:
1. Turn on the smartphone's Wi-Fi network.
2. Enter the Label Translator App.
3. Enter the Information module.
4. Press the scan code button.

For mobile data:
1. Turn on smartphone mobile data.
2. Enter the Label Translator App.
3. Enter the Information module.
4. Press the scan code button.

Expected results:
Adequate display of product information graphically.

Results obtained:
- The App shows the barcode, product name and image.
- Shows the list of fats in grams and energy in kcal.
- Graphically, through teaspoons, it shows the amount of sugar, salt and fat of the scanned product.
- Titles are displayed in various colors.

Observations:
If the scanned product is not found in the database, the App sends a message indicating that it does not exist and must be captured in the App.

Test Result:
- Approved
- Not approved
### Table 4

**Test Log Fragment**

<table>
<thead>
<tr>
<th>Clue</th>
<th>Date</th>
<th>Results obtained</th>
<th>Status</th>
<th>Results</th>
<th>Severity</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>TE-M-v01</td>
<td>08/10/2021</td>
<td>The App shows the barcode, product name and image</td>
<td>Finished</td>
<td>Approved</td>
<td>high</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shows the list of fats in grams and energy in kcal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Graphically, through teaspoons, it shows the amount of sugar, salt</td>
<td></td>
<td></td>
<td></td>
<td>The link that allows you to add the new product does not work</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and fat of the scanned product</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Titles are displayed in various colors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TE-M-v02</td>
<td>08/16/2021</td>
<td>The scanned product is not found in the database, the App sends a message</td>
<td>In progress</td>
<td>Not approved</td>
<td>high</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>indicating that it does not exist and must be captured in the App. It must be</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>sent to a link for capture</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TE-M-v02-1</td>
<td>03/17/2022</td>
<td>The scanned product is not found in the database, the App sends a message</td>
<td>Finalized</td>
<td>Approved</td>
<td>high</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>indicating that it does not exist and must be captured in the App. It must be</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>sent to a link for the capture</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>TE-M-v03-1</td>
<td>08/18/2021</td>
<td>The system does not save the information in the Database</td>
<td>In progress</td>
<td>Not approved</td>
<td>Low</td>
<td>In the form, it appears to save the information, but it is not</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>recorded in the database</td>
</tr>
<tr>
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<td>03/18/2022</td>
<td>Database connection verified</td>
<td>Finalized</td>
<td>Approved</td>
<td>high</td>
<td>The data of the new product is stored appropriately in the DB</td>
</tr>
</tbody>
</table>

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### 5 CONCLUSIONS

The growth and penetration of mobile applications in our country allow actions aimed at solving social and public health problems, such as the case of obesity in Mexico, to permeate a greater number of people.
On the other hand, the personalization that mobile applications allow, combined with an easy-to-understand interpretation of the front labeling of packaged foods and beverages, will help the user make better decisions regarding the products they consume.

The multidisciplinary work in which researchers and experts interact allows the obtaining of technological tools with solid theoretical foundations that are useful to guide the user on important topics such as health.

At the beginning of the project, it was proposed to develop an App that would allow the consumer to obtain nutritional information about food products in a simple and easy-to-understand way; in addition to knowing in a personalized way your daily energy requirements and the percentage of sugar, sodium and fat that you agree the recommendations of the FAO, WHO and UNU; These objectives were achieved, since, as shown in the results section, an App was developed that scans the barcode of a product on the front label and graphically shows the sugar, sodium and fat content of the product in teaspoons. same; as well as, calculates the daily energy requirements of a person according to their sex, age, weight and level of physical activity.

Finally, it was established to test the App which made it possible to detect errors in a timely manner and make the pertinent changes, as evidenced in the test case.

It is intended to update the application to a multi-platform modality that allows a greater number of interested parties, as well as the incorporation of more recent labeling applicable to Mexico.

Carry out multidisciplinary work with faculties or health institutions to consider the aspects of their area of knowledge in the application.

REFERENCES


Mobile Application for Understanding Nutritional Labeling Focused on The Consumer


