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Integrated System for the Population's Education for the Foodstuffs' Nutritional Labeling

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Abstract

Healthy eating of the population is an extremely important and complex matter for all mankind. A key point of Directive 2000/13/EC gives consumers the opportunity to obtain all the essential information, concerning the composition, manufacturer, methods of storage and preparation, the existence in the content of substances known as allergens and other things that can harm the consumer, from their foods' labels. In accordance with European Regulation (EC) No 1924/ 2006, the claim is that these should be allowed, only if they are well understood by the average consumer. After some research under the NUTRILAB project (FP7- PEOPLE- 2012- IRSES, 318 946 - NUTRILAB, Nutritional Labeling Study in Black Sea Region Countries project), it was confirmed that there existed negligence in the labels produced by some manufacturers and many problems in the joint knowledge and understanding of nutritional labeling messages by the consumers. This paper predicts the structure of an integrated system of consumer education and awareness, using a complex of rich management with modern techniques and methods of education, geared towards achieving healthy nutrition with adequate consumption for actual consumer health. The chosen system is integrated into existing programs on tuition and educational levels, and in-service training or further training. It foreshadows a government operative accept action for that policy application, focused on the primary objective of the health of populations through awareness' attitudes in the correct reception of messages by the nutritional labeling.

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1. Introduction

Everyone's health depends very much on healthy eating, with a diet consistent with the nutritional needs of everyone. The marketing of foodstuff is highly developed, being highly profitable commercial activities. In order to achieve greater safety in food consumption, the European Union has introduced certain regulations on the nutrition labeling of foodstuffs. Thus, Directive 2000/13/EC gives consumers the opportunity to have, on the food label, all essential information concerning the composition, manufacturer, methods of storage and preparation, the existence, in the contents, of substances known as allergens and other things that may harm the consumer et al. Also, the European Regulation (EC) No 1924/2006 stipulates the need to label directions which can be understood by the consumer.

1.1. Literature review

Health professionals agree that the relationship between diet and health is important. Our eating habits can help or hurt our overall health and well-being. Good eating habits include being a smart shopper and selecting foods that reflect the Dietary Guidelines. In the literature, there are several approaches to the subject from different points of view, consistent with various commercial and educational systems. For example, it is interesting to note, from experimental research conducted in India, some knowledge and practices about the use of food label information among adolescents attending schools in Kolkata; there it was concluded that although 88% of adolescents read food labels, many read only the date of manufacture (79%), its expiry date (74%) or best used before dates (65%). Fewer adolescents read the ingredients (50%) and nutrition information (20%). Their knowledge about quality symbols was low. Many of them, (over 60%), recognized the symbols but had no knowledge of what they indicated. About 66% believed that nutritional information on labels was too complex to understand (Saha, 2013; Nayga, 1999). Another work, related to a method proven to be quite effective, was a randomized control trial evaluation of a literacy after-school program for struggling starter readers. In this case, the evidence for effective in-school programs for struggling early readers, in relation to after-school interventions focusing on academic outcomes, is particularly weak, that programs are not based really on the academic and research approach. This study seeks to contribute to this body of evidence through a randomized trial ($n = 464$) of an after-school literacy program (*Doodle Den*) for struggling early readers in a deprived area of Dublin, Ireland. The program was based on a balanced literacy framework, was delivered in group settings and had a strong focus on staff development. *Doodle Den* was found to improve the children's overall literacy ($d = +0.17$), teacher assessments of their literacy ability ($d = +0.28$) and to positively impact on problem behavior in ordinary school classes ($d = -0.18$). Also, it revealed some implications for the development of after-school programs (Biggart, Kerr, O'Hare & Connolly, 2013). There has been more research in embedded systems' education, in terms of both theoretical and practical education at primary, secondary and upper levels. The literature is quite rich, but not study the problem from the point of view of an integrated system for education. Interestingly, it is the view expressed by A. Kerstin, about the "integration of theory and practice in higher education (Arnesson & Albinsson, 2012), in respect of the aspects looked for in conceptualizing learning processes towards vocational competence, in one mechanism of integrating knowledge, skills and attitudes" (NUTRILAB, 2013).

1.2. Power Engineering Domain Application

The nutritional labelling of foodstuffs, in and out of European countries, can have an influence on the health and welfare of the population. The food label was designed to help people choose foods for a healthy diet. By using the food label, we can compare the nutrient content of similar foods, see how foods fit into our overall diets and understand the relationship between certain nutrients and diseases. Three types of claim are allowed to be made on foods throughout the European Union:

- Nutrition claims which state, suggest or imply that a food has particular beneficial properties, due to its composition (regarding energy or a particular nutrient). Examples of this type of claim will be; 'source of', 'free of', 'high', 'low' or 'reduced' in calories or a particular nutrient.
- Health claims, which state, suggest or imply that a relationship exists between a food or one of its components and health. This type of claim mentions the physiological function of a constituent such as 'calcium can help build strong bones'. The claim must be based on generally accepted scientific data and be easily and correct understood

by the average consumer. Health claims describe the relationship between a nutrient or a food and the risk of a disease. Products that make a health claim must contain a defined amount of the nutrient that is directly linked to the health-related condition.

- ‘Disease risk factor reduction’ claims. They are a specific type of health claim, which state that a food or one of its components significantly reduces a risk factor for human disease. For example, phytosterols can help to reduce blood cholesterol, thereby reducing a risk factor for cardiovascular disease. For the first time, mention of diseases will be allowed on food, but only after approval by the European Food Safety Authority (EFSA).

Food labeling is required for most prepared foods, such as bread, cereals, canned and frozen foods, snacks, desserts, drinks, etc. Nutrition labeling for raw produce (fruits and vegetables) and fish is voluntary. We refer to these products as "conventional" foods (NUTRILAB, 2013). Nutrition labels can help anyone to choose between products and keep a check on the amount of foods high in fat, salt and added sugars that you're eating. Nutrition labels can also provide information on how a particular food or drink product fits into your daily diet. Consumers are often confused by health claims on food labels, according to a review of research carried out on behalf of the Agency, in anticipation of a new European regulation on health and nutrition claims. In January 2007, Regulation 1924/2006 on nutrition and health claims made on foods, was published and will apply in EU Member States from 1 July, 2007 (Regulation EC 1924, 2006). This is the first piece of specific legislation to deal with nutrition and health claims (EC 1333, 2008), (EC 1169, 2011), (EC 432, 2012), (Romanian 685, 2009). Its aims are:

- To ensure a high level of consumer protection by guarding against unsubstantiated, exaggerated or untruthful claims about foodstuffs. With the new legislation, consumers can rely on clear and accurate information on food labels, enabling them to be properly informed about the food they choose.
- To harmonize legislation across the EU, by providing food producers and manufacturers with clear, harmonized rules that will enable fair competition to help protect innovation in the food industry, by ensuring that manufacturers make genuine health and nutrition claims and are not competing with false or inaccurate claims.
- The Regulation will apply to any health and nutrition claims made on food or drink products produced for human consumption to be sold in the EU/ Member States’ market, including all commercial communications, generic advertising and promotional campaigns. It is also applicable to foodstuffs for particular nutritional uses and supplements.

According to European Regulation (EC) No 1924/2006, health claims should only be authorised if they are well understood by the average consumer. This condition will be important, both in deciding whether a claim should be authorized, and in the enforcement of the presentation of claims, when deciding whether consumers are being misled. In order to help implement this condition, the Agency commissioned EdComs, a specialist educational consultancy, to conduct a review and analysis of the existing scientific literature in this area. To take account of as much relevant information as possible, research was conducted into consumer understanding of food labelling in general, where this could be used to draw conclusions about consumers’ understanding of claims. After an initial survey of a sample of the Romanian population, it was noted that 45% of those surveyed didn’t understand food labeling and 85% of these didn’t understand nutritional labeling. This is a serious reason for us to determine a complex process of educating of the population in the most appropriate food consumption choices, peculiar to everyone's health. That integrated system proposed can to help through the population's education to be able to choose what is healthy for each one, to him.

2. Methods

In order to find the most appropriate method to achieve the educational objectives established, it was set into account, (methods based) both by educational general methods and principles, but also from focused methods on different features of the consumers, or on the specifics form of the training. General forms and particular forms specific to different categories. Thus, is concluded the necessity of integrating the theoretical notions into existing programs from different fields, (chemistry, biology, civics, technological education, and others), and the creating of some explicit motivations for individuals, with some minimum competence necessary for understanding the content and labelling of nutrition.

2.1. Participants

The working method was applied to 181 people from Romania, Timis County, on the age groups as shown in table 1.

Table 1

Number of people surveyed	33	26	24	25	28	26	19
Age range(years old)	7÷10	11÷14	15÷19	20÷26	27÷45	46÷60	More than 60 years

All persons admitted to this study firstly agreed that they usually did not read the labels and didn't understand nutritional labelling.

2.2. Assessment procedures

The research team analyzed the structure of the participants' group in this study, noting that these were representative for the study's objectives. It was realized as a unitary work plan compatible to all participants. All participants were made aware of their importance in this study. The experiment was conducted in three phases over a period of three weeks; each participant had to collect, from shops each week, ten labels from foods which they would normally eat. We compiled some brief discussion sheets with each participant at the end of each week. We performed a simulation of the procedure and, after that, applied the necessary corrections.

2.3. Analysis

It was made an analysis of the proceedings in the perspective of its further extension of the experiment. It was prepared with some scenarios on the conduct of the experiment, after which they issued some hypotheses about possible outcomes.

2.4. Implementation

On the first day of the experiment, all the participants were sent the first task, which was to collect ten labels from the food they'd consumed. During one week, each participant had chosen ten labels from the foods they'd consumed. Then they were asked to provide justification for their choice from the market. It was followed by a short individual discussion with each participant. The summary of the discussions was recorded in a personal discussion file of each participant. It has been talked about the content of the labels collected, about the knowledge of nutritional restrictions in relation to their own health status of each participant. The research team reviewed each case. For each participant were prepared fact sheets containing tips on how to choose foods based on information on their labels. These observations were presented to each participant. This procedure was repeated 2 more times. Thus, we could track the behaviour of each participant in both the correctness of choosing the right food, and the behaviour of each participant during discussions, the progress in taking positive attitude towards learning the rules and principles of nutrition, effective activation of the own initiative.

3. Results

These three summaries were connected/joined per each participant. Also, the information from the sources was retained from all the participants, in order to understand the details from the labels. At the last meeting with each participant, each was asked questions about their future attitude towards the reading and understanding of the content on food labels. Participants were asked about the required elements which had to be on the labels, according to European standards, such as (Mnerie, 2013): the list of ingredients; any ingredient or processing substances or products causing allergies; the quantity of certain ingredients or categories of ingredients; the net quantity of the food, (g, ml, kg); the date of minimum durability or the 'use by' date; any special storage conditions and/or conditions of use; the name or business name and address of the food business operator; the country of origin or place of provenance; instructions for use where it would be difficult to make appropriate use of the food in the absence of such instructions; the energy value, per portion or per consumption unit alone, (kcal and kJ); of fat; saturates, sugars

and salt; food information provided on a voluntary basis; fat mono-saturates; fat polyunsaturated; polyols; starch; fibre; vitamins or minerals; additional particulars; foods packaged in certain gases; foods containing glycyrrhizin acid or its ammonium salt; high caffeine content; added phytosterols; phytosterol esters; phytosterols or phytostanol esters; indication and designation of ingredients; quantitative indication of ingredients.

3.1. Main analysis

The results were analyzed by the project team. It was been tracked the particulars elements for each age group. Also, for each participant was monitored the progress of knowledge about nutritional labelling and the food needs in relation to their own health status.

3.2. Exploratory analysis

A thorough analysis of the results was performed in two main directions:

- the tracking of the behavior of individuals;
- the competency of the individuals and/or bibliographic sources who were asked to give the necessary information.

Results which were tracked:

- the participants' motivation for learning;
- the educational components required to achieve an integrated system of education for the purpose.

The centralized data were introduced into the Table 2. The percentages mean the average of the gradual appreciation of acquired knowledge about nutrition labeling.

Table 2

Age range(years old)	7÷10	11÷14	15÷19	20÷26	27÷45	46÷60	More than 60 years
The increase in motivation towards learning of the new concepts, [%]	87	68	72	65	64	77	81
The increasing of interest in food labeling, [%]	91	84	72	67	74	80	83
The increase in the level of knowledge, [%]	56	61	74	72	75	89	80

Besides these percentages, it was found that there were major deficiencies in the level of knowledge, of the education level of persons consulted. Especially young people, aged over eleven years and adults, have used multiple sources of information; principally, the Internet. The participants wanted to learn from their parents, friends, teachers and physicians to build upon the reading and understanding of labels.

4. Discussion and conclusion

First, it is found that most participants did not understand their responsibility to develop the level of their knowledge by own initiative, and to address to the educational system, to request from specialists, or specialized organizations with many details about nutritional labelling. It is necessary for the development of the forms for the preparation / training of the population in the spirit of mutual help. The information collected from the participants throughout the experiment include very interesting aspects about the changing of the interests for learning, when the participants having understood and mastered in fact the own purpose, this of being healthy. Additionally, it must be recognized that the development of certain diseases can be influenced by a lot of other factors, such as work exercise or heredity. So, health claims from labels cannot state the degree of risk reduction. As a result on labels it must use words such as "may" or "might" in discussing the food-disease relationship. Nowadays, the bio-economy is strongly orientated towards organic agriculture and organic products. For this we propose to elaborate other research about the organic labels, as a other part of the claims allowed in the EU. For the next studies it is necessary to review and analyze the manufacturers' understanding of the EU's claims and also the nutritional labelling importance. Where this would realize at optimum level, they can help for consumer understanding of the EU's claims and also the health effects. To gather information on how the consumers understand this nutritional labelling claims it must to make

studies to across different population groups, for to gain insight into the understanding of the "average consumer". After the finishing of all these similar researches it will can to draw conclusions to see whether there are areas where missing further information which would be useful for to inform the EU directions to any additional research conducted in future. We will reach these targets as a multidisciplinary team across Europe, sharing knowledge and developing new approaches. A strong component in this framework will be capacity building. We will explicitly aim to identify and integrate the different and overlapping conceptual understanding of scientists from the different disciplines carrying out joint research in this project. This integrated system for education of the populations is designed to produce specific outputs. These include workshops to discuss the results, a website, a working paper series to put the research results quickly into the public domain and books covering the scientific achievements. Overall, the work packages aim to widen an established research agenda and develop a new conceptual and methodological approach. These will assist in promoting the new approaches in food labeling and transferring these between EU and non-EU countries.

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