

Research about the degree of accomplishment of the Science Greek curriculum goals in the scientific field of nutrition and health.

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Abstract

Modern curricula need to have a significant target towards issues that enhance the relationship between science and everyday life. The purpose of the present work is to investigate, interdisciplinary, whether educational objectives in the area of healthy eating are achieved. For this purpose, a questionnaire was developed and implemented on 208 secondary school students. The questionnaire was created after researching all school textbooks in primary and secondary education and the choice of topics includes, to a large extent, the modules, the topics, the worksheets and activities contained in them. The analysis of the results shows that the educational objectives are moderately achieved. This is particularly important as the research findings can be used as guides in shaping new curricula in the future.

Keywords: curriculum, modulation of educational objectives, nutrition, health education, everyday life

Introduction

Modern curricula need to be significantly related to issues that enhance the link between science and everyday life (Tsapalis, 2000). Indeed, in modern syllabuses there are respective goals, most of which are confined to the cognitive domain of Bloom's taxonomy of teaching goals (Matsagouras, 1997). Targeting on issues related to the emotional and psychomotor field is relatively limited (Driver & Oldham, 1986; Petridou et al., 2010) and the achievement of those goals is usually being sought by subjecting trainees to appropriate stimuli, relevant to the above goals and activities (Novak & Gowin, 1984). The approach is often interdisciplinary. In Greek curricula such objectives are met at all levels of education, especially in subjects such as Environmental Studies, Chemistry and Biology. Of particular interest is the introspective concern on whether and to what extent the above goals (with regard to the cognitive field) are ultimately achieved. This concern was also the reason for the present investigation. Issues related to health education (Mogensen, 1997) and in particular the thematic areas related to healthy nutrition are quite useful in exploring this concern. Teaching objectives are even formulated in the early grades of primary education. Their achievement is sought not only by the teaching material included in school books of the Environmental Studies (Primary Education) and textbook series of Chemistry, Biology and Economics (Secondary Education), but also by the large number of worksheets and laboratory guides. In addition, in the relevant books provided to the teacher, particular reference is being made to the specific objectives of nutrition and the adoption of health-positive habits in everyday life (Digital School, 2019).

Methodology

The present research was conducted using closed-ended questionnaires on 208 high school and lyceum students. The survey has been conducted in the middle of the second semester of the school year 2018-19. The questionnaire was created after researching all primary and secondary school textbooks and the choice of topics relates, to a large extent, to

the modules, topics, worksheets, activities, etc. contained in them. The teaching methods that are suggested in the “teachers’ books” in order the teaching objectives to be achieved were also explored by conducting an explicit review of the literature, in order us to enhance the selection of the most suitable questions that correlates to the topics most relevant to above material. In the applied questionnaire closed-ended, multiple-choice and divisive answers have been used (Paraskevopoulos, 1985). A part of the questions were formulated in order statistical tests (such as control intersections, crosstabulation) of the results to be carried out. In this contest the reliability and the validity of the results of the present study are enhanced (Kember & Leung, 2008). The students completed the questionnaire with the presence of the teacher in the class and the duration of the activity lasted an hour. The interest of the participants was high. A significant percentage of the students requested an immediate feedback for their answers as soon as the questionnaire has been completed.

Results

The examination of our results leads to the conclusion that most teaching goals are not achieved to a great extent. Indicative results are presented in 8 questions.

Question 1: Which of the following vitamins is very important for the good health of the bones?

- a) Vitamin D, b) Vitamin C, c) Vitamin A, d) Vitamin B*

The highest percentage of the sample was attributed to the incorrect answer 'Vitamin C', as shown in Figure 1. There is a tendency of the sample to have more familiar or more hypertensive responses to their school experience as the 'storm' of information on vitamin C (comparatively always to the other vitamins) works in the opposite of the intended.

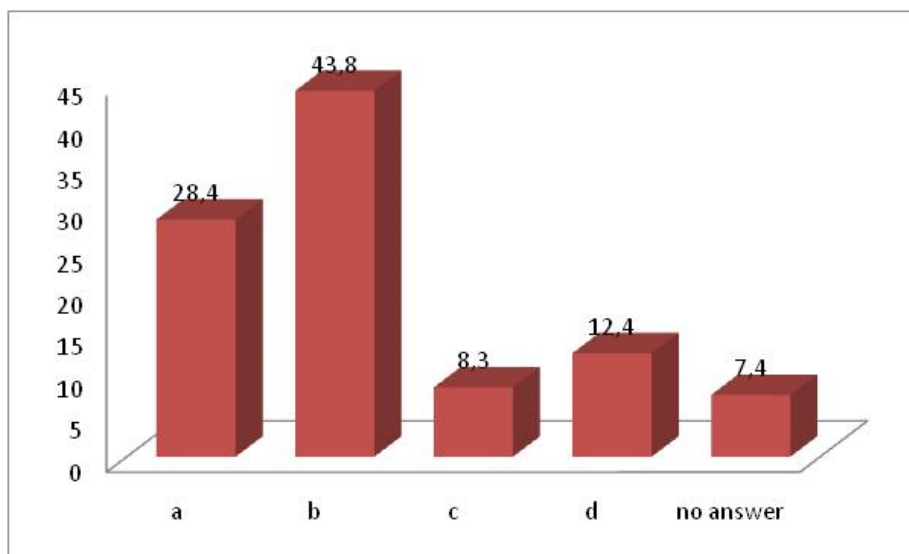


Figure 1: The opinion of the sample on the vitamin that is more important for the bones. Each column represents the % percentage of the correspondents that select the respective answer.

Question 2: How many groups of foods do we get while consuming spaghetti with minced meat and cheese?

- a) 2, b) 3, c) 5, d) depends on the quantity we consume*

In this question (Figure 2) only 16% of the sample answered correctly while the same percentage (15.7%) gave the completely incorrect answer d. A great majority of the sample

(54.8%) gave the incorrect answer, the “3 groups of food” answer, which probably simply summed up the types food consumed: spaghetti, minced meat and cheese’. This possible misunderstanding can be investigated by crossing the results of this question with those of question 3.

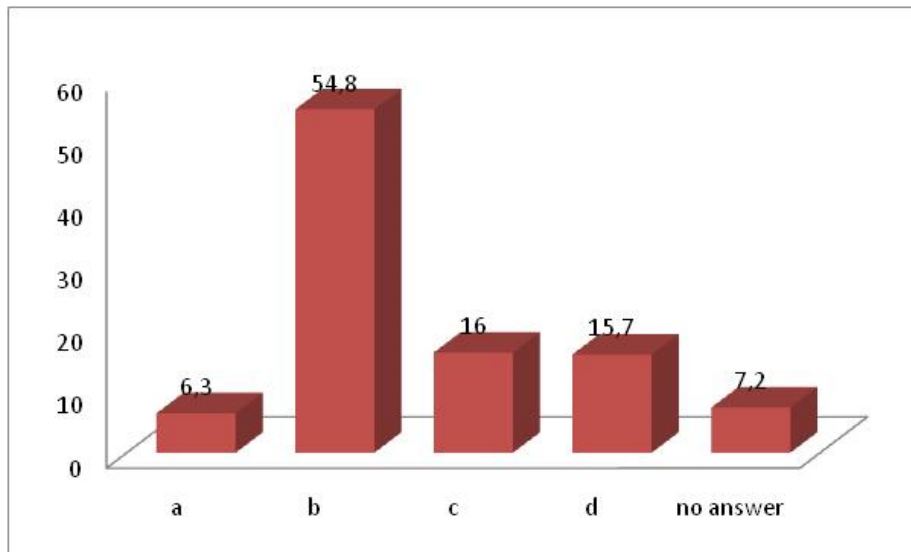


Figure 2: The opinion of the sample on the number of food groups that are included in a specific food recipe. Each column represents the % percentage of the correspondents that select the respective answer.

Question 3: The number of groups in which food is classified is:

a) 2, b) 3, c) 5, d) depends on the amount of food

The largest percentage of the sample (55.9%) gave the correct answer. The statistical crosstabulation of questions 2 and 3 shows that 64.7% of the sample, who probably, as we mention above, added the food items in question 2, answered correctly the question 3. This finding reinforces the argument made for the behavior of the sample related to the question 2, with the value of relevance being high (Sudman & Bradburn, 1982). It cannot, in addition, be overlooked that 16% of the sample selected the completely incorrect answer d. The same has been observed in question 2.

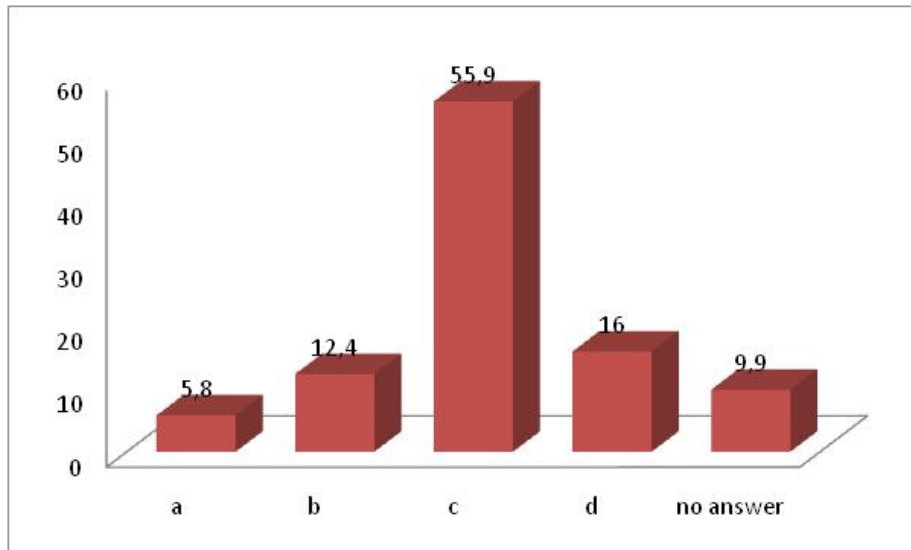


Figure 3: The opinion of the sample on the existing food groups. Each column represents the % percentage of the correspondents that select the respective answer.

QUESTION2 * QUESTION3 Crosstabulation

Count

		QUESTION3				Total
		a	b	C	D	
QUESTION 2	a	2	3	7	0	12
	b	7	13	70	18	108
	c	0	5	21	5	31
	d	2	4	16	8	30
Total		11	25	114	31	181

Figure 4: Crosstabulation-questions 2,3

What can be precisely stated is that the sample faces a great deal of difficulty in question 2. That should not happen (or at least to such an extent) as this question exists as a prototype in all books and worksheets in classes of primary education, as well as in the first grades of gymnasium where there is an extensive reference to nutrition in the class of home economics. It could be argued that the above finding could be related to the type of teaching method suggested to the teachers in the teachers' books or the methods that teachers apply to their teaching. Nevertheless, the teaching approach method had not been included in the research goals of the present study. On the other hand such a type of research goals would be extremely misleading, given that the respective classes and lessons have been carried out several years before the time period that the study was conducted on the students of the sample. In addition, the fact that the sample shows a completely reversed behavior in Question 3 leads to the conclusion that while the sample seems to know the number of food groups, it is unable to apply this knowledge given that answers incorrectly in Question 2. So it cannot be said that the syllabus has been achieved.

Particularly useful are the results of the divergent answer questions used in the present study, some of which are presented below.

Question 4: *Mark the following sentences as correct (C) or incorrect (I):*

- 4a) *The recommended amount of fruit and vegetables is one portion per day.*
- 4b) *Olive oil is very good for our health.*
- 4c) *Poly-unsaturated fatty acids influence negatively our health.*
- 4d) *Saturated fatty acids should be avoided in our diet.*
- 4e) *Vitamins give energy to our body.*
- 4f) *Olive oil contains saturated fatty acids.*
- 4g) *We gain more weight by consuming one gram of carbohydrate than one gram of protein.*

In question 4a, the majority of the sample (54.8%) responds incorrectly (Figure 5) and does not seem to have understood that one portion of fruits and vegetables is insufficient (something compatible with the modern type of diet). However, it is likely that the sample has a misrepresentation of the meaning of the word portion as used in the diet rules. Although there is an extensive reference to all levels of education, the results are not encouraging, given that the correct answers should be more than the incorrect ones, since the question was even cross-referenced.

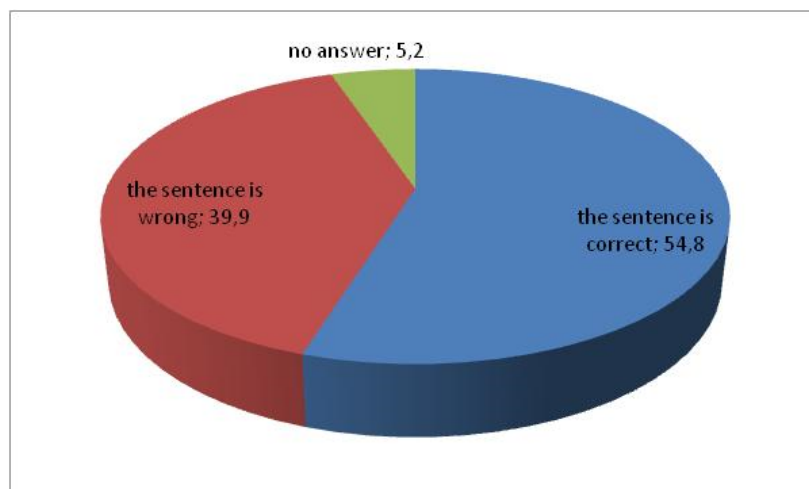


Figure 5: The percentage of answers related to the recommended daily number of portions of fruit and vegetables

In question 4b the results are much better. The sample responds by a strong majority (82.4%) correctly (Figure 6).

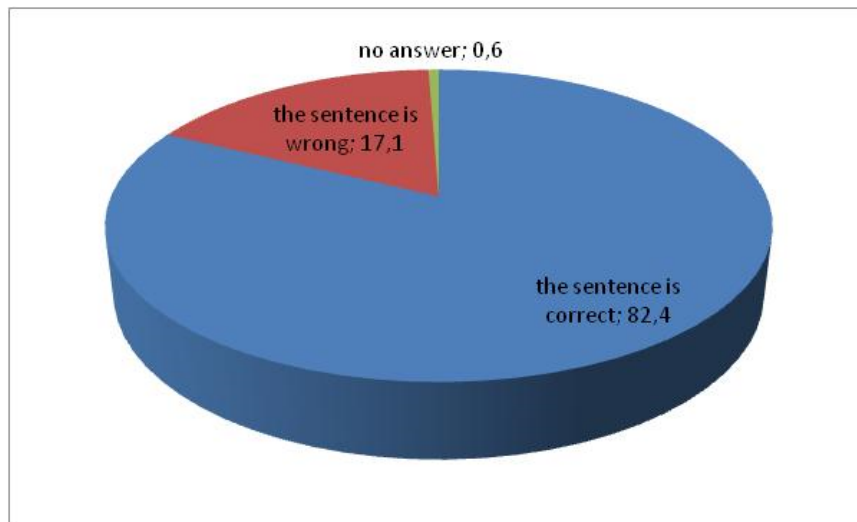


Figure 6: The percentage of answers related to the impact of olive oil in good health

In Question 4c, the sample responded by a marginal majority (48.8%) incorrectly (compared to the 43.3% that corresponds correctly), (Figure 7) possibly being drifted away, to some extent, by the “noise” and the extreme negative opinion (used deliberately) in the phrasing of the question ('Polyunsaturated' and 'very' bad).

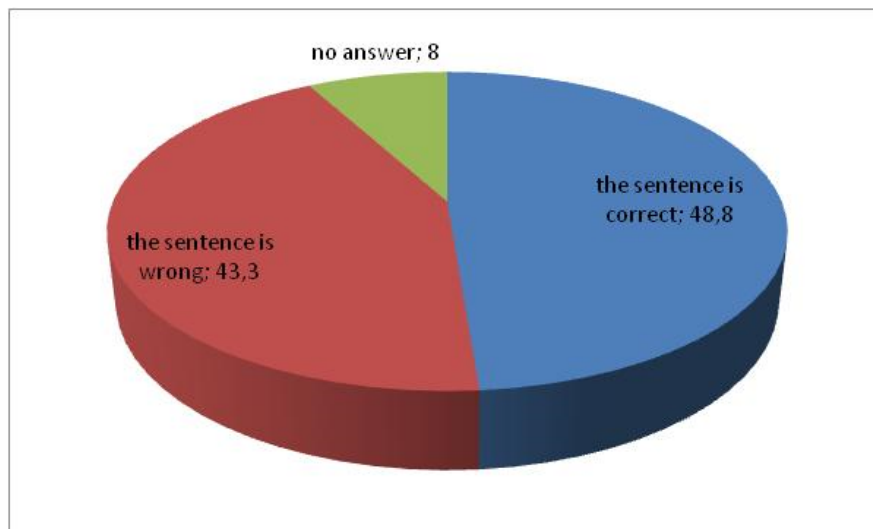


Figure 7: The percentage of answers related to the negative impact of Polyunsaturated fatty acids on health

In contrast to Question 4d, the sample responds by a significant majority (56.5%) correctly (compared to 35.8% that answered incorrectly) by reinforcing the arguments for the phrasing of the sentence of Question 4c (Figure 8).

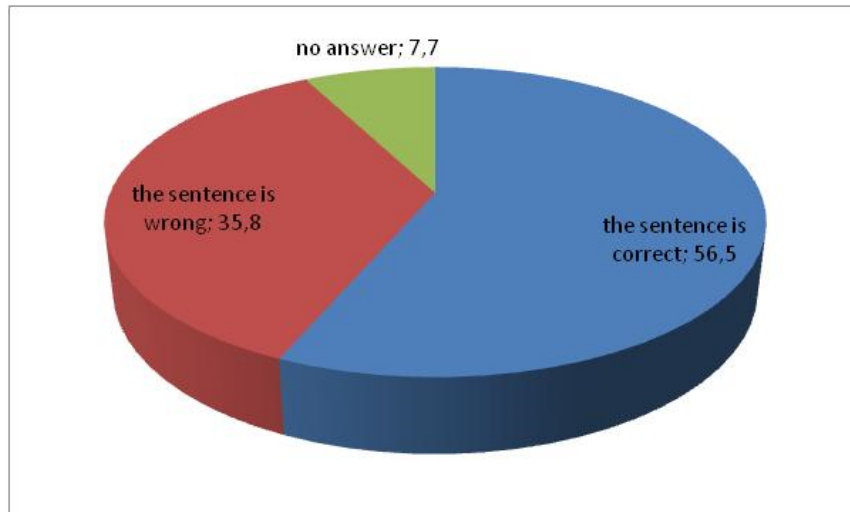


Figure 8: The percentage of the sample related to its attitude related to the impact of consumption of saturated fatty acids on health

In Question 4e, the sample seems to have a formulated “alternative idea” (Skoumios, 2012) something that needs further investigation. In any case this is certainly a useful finding (Figure 9).

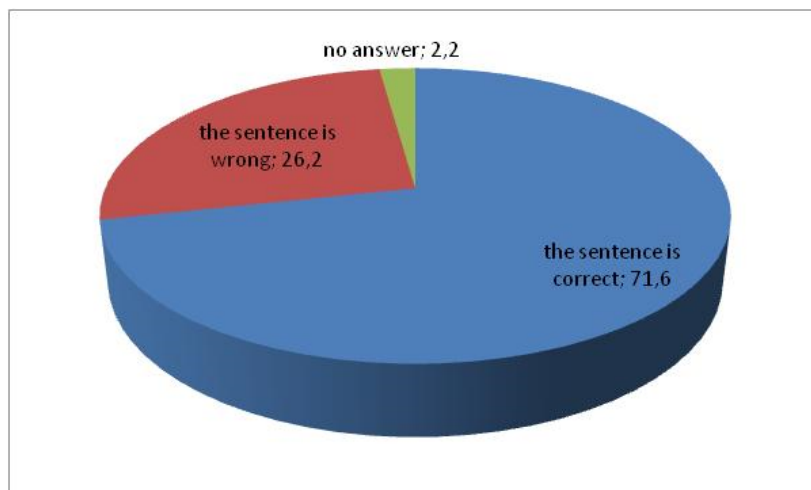


Figure 9: The percentage of the sample related to the possible role of vitamins as energy sources

A very large percentage of the sample (71.6%) gave the wrong answer to this question, considering that vitamins are a source of energy (Figure 8). This examination seems to add and confirm at least qualitatively, but to a large extent, an “alternative idea”, to the large body of research found, a number of “alternative” ideas that students have about the meaning of energy and almost everything related to it. (Milios & Argyrou, 2017)

In Question 4f, the sample appears to be “split” (Figure 10), with response rates almost equally divided (42.1% and 47.4%).

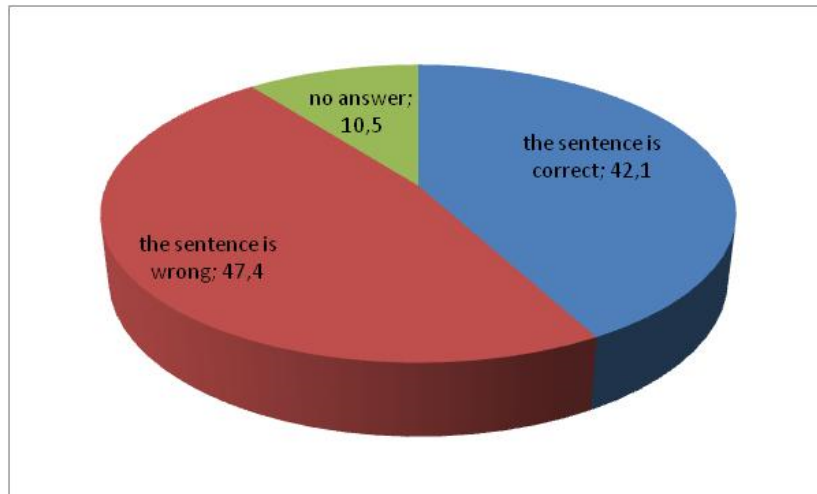


Figure 10: The opinion of the sample related to the possible presence of saturated fatty acids in olive oil

However, the intersection of questions 4b, 4d and 4f is of great interest.

It seems that 75.1% of the part of the sample that believes that olive oil is very advantageous for our health and at the same time believes that saturated fatty acids are harmful to the health, it does also believe correctly that olive oil does not contain harmful fatty acids. On the one hand this relevance (of the triple cross checking) is an optimistic finding on the achievement of the relevant educational objectives (given that the respective questions are a set of objectively more difficult questions due to the chemical terminology that involve) and on the other hand it enhances the credibility of the research.

In question 4g, the sample responds wrongly with a marginally relative majority (39.4% vs. 33.1%), despite the fact that the energy value of foods is often present in both primary and secondary education.

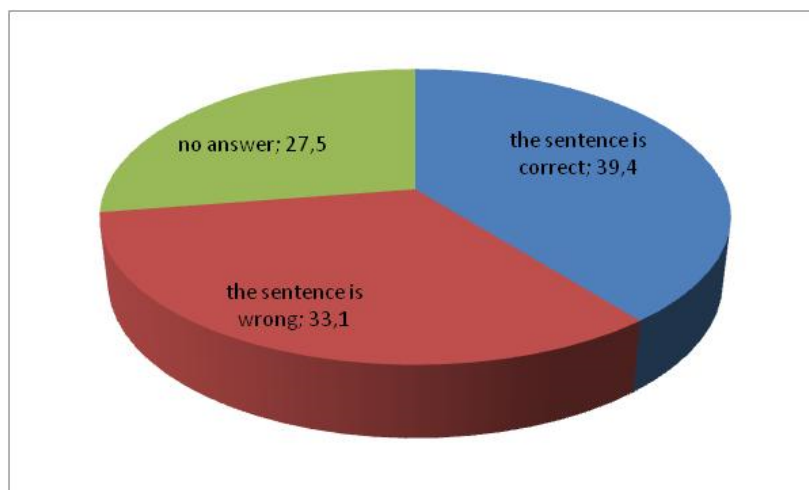


Figure 11: The opinion of the sample on the possible weight gain difference followed by the consumption of the same mass of different food groups

Conclusions

Identifying and organizing the teaching goals and objectives of the themes and activities related to the thematic unit of nutrition in the context of health education, and in particular by different sciences, is a useful tool, even in times of change in the various levels of education, with one of the main demands being the interconnection with everyday life.

But even more important is the utilization of research findings not only with clustering, but mainly by the measuring of the extent to which the desired goals are practically achieved, with the findings being able to be used as guides in shaping new programs in the future. A key component of the success of these programs is the selection and proposal of good practices applied in teaching, with the bibliographically suggested methods applauding the use of student-centered approaches, especially on issues with strong connection with everyday life.

One of the useful findings of the present research is the discovery that the teaching objectives (with regard to the cognitive field) of the curricula in the field of nutrition are not achieved. The above research result highlights and reinforces the need to restructure several parts of the relevant curricula. The extension of the research application to other educational grade will further strengthen this indication.

In addition, the implementation of the present study confirms the need to significantly strengthen the focus of the new educational programs on issues related to the development of the attitudes of the students on issues referring to nutrition and especially on such a sensitive theme as that of healthy eating. The remarkable interest of the participants and especially the immediate formulation of questions and queries on the issues explored but also on other issues related to the adoption of healthy living habits, are a parallel but also a quite important research finding. The investigation of the relevant attitudes needs further study and is the subject and goal of an ongoing research study by the authors of the present work.

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