Co-funded by the European Union

SURVEY ASSESSING KNOWLEDGE, SKILLS, INTERESTS AND ATTITUDES OF SECONDARY EDUCATION STUDENTS AND TEACHERS, RELATED TO THE THEMES OF THE PROJECT

REPORT OF FINDINGS – *SPAIN*

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[June, 2022]

1. INTRODUCTION

2. CONTEXT

a. Spain secondary education system architecture, school subjects included in the official program, level of STEAM integration in formal secondary education.

The current Spanish Education System

The Spanish Education system has been subject to a number of reforms in recent years. In most parts of Spain schooling is now available to children from the age of three, although the obligatory age for starting school is five years old. Children are admitted once a year (in September), strictly according to the calendar year of their birth. The normal registration period for all ages is in May for the following September, and may be done via the local town hall, or by applying directly to a school.

Infant Education

Educación Infantil (EI) lasts for three years and teaches children about social, personal and environmental values, as well as developing their physical and mental skills. They are gradually introduced to reading and writing from 4 years old and will have covered their alphabet by the end of EI, although fluent reading ability is not expected. EI is one of the newest areas of Spanish education and is generally well-taught by dedicated specialist teachers.

Primary Education

At six (or nearly six), children progress to *Educación Primaria (EP)*. This lasts for six years and is divided into three cycles (*ciclos*). The objectives of primary education are planned over each two-year period, at the end of which any child who is considered not to have achieved these objectives may be required to repeat the second year of the cycle. Students study the following subjects throughout Primary education: Spanish language (*lengua*), Maths (*mates*), *Conocimiento del Medio,* also known as *Cono* (a general knowledge subject which includes biology, history, geography, general and local knowledge and social awareness, Physical Education (*Educación Física or EP*); Arts and Crafts (*plástica*), and a second language, usually English (*inglés*). English will be taught by a specialist, but there is no obligation for the class teacher to speak English. In addition many students will study Religion (*religión*) which mainly consists of teaching Catholic doctrine.
The state system provides support teams of psychologist, sociologist and speech therapist which are shared by several schools. Children normally have the same class teacher for each two-year cycle. Teachers make themselves available one hour a week to speak to parents about their children's progress (*tutoría*). There are also parents' meetings every term to discuss class work and special projects and trips.

From about year 3 children are introduced to termly exams, but there is no equivalent to national testing in the Spanish system (at this age). Although state education is free, parents will have to buy all textbooks and materials. Uniforms are generally worn by students in religious private schools and grant-assisted schools.

Secondary Education

From age 12 (or nearly 12) children move on to Secondary school (*el Instituto*). The Secondary Education Programme in Spain is designated 'Educación Secundaria Obligatoria' (ESO) and it is an obligatory education stage that consists of four academic years that follow the Primary Education. Children can leave school at the end of this period or at the age of 16 if they reach this sooner. Students can remain up until 18 y old if they need to repeat some courses. ESO is divided into two cycles with the same system of repeated years at the end of each cycle as occurs in primary education.

A wide range of secondary subjects are taught, including a language choice between French and English. Until recent years, secondary education in Spain was very conventional with a lot of memorization learning and constant tests and examinations. There have been marked improvements with the introduction of project work, continuous assessment and more up-to-date and relevant

curricula. However, much still depends on the approach of individual teachers, and there has been a general lack of investment in retraining and resources to make a total success of the scheme.

One of the main criticisms of the new secondary system centres on the discipline problems which result when teenage children who are repeating courses are placed in the same classes as younger and more academically-inclined children. There is still much debate about the success of reforms in secondary education, and more improvements are being introduced.

At the end of the four years of ESO, students may leave school, go on to the two-year *Bachillerato* academic course, or enroll on practical training courses called *modulos*.
There are four types of *Bachillerato* – Arts, Humanities, Natural and Health Sciences and Technology. *Modulos* include office and administrative skills, mechanics, catering, and hairdressing.

University

After two years in *Bachillerato*, students have intensive examinations during the month of May and their final mark is based on a combination of examination results and continuous assessment. A month later, in June, students who wish to go to University take a general university entrance examination (*Selectividad*) and the university course they are able to follow depends on the result of this examination along with their *Bachillerato* results.

School Calendar and Timetable

The Spanish school year starts in mid-September and ends in the third week of June. There is usually a break of two weeks or so at Christmas and about a week at Easter. There are no half-term holidays as such, but there are short breaks throughout the year which are organised around national, regional and local saints' days and festivals. There are two kinds of timetables, a divided day which allows at least two hours for lunch, or the innovation of the *jornada continua*, a blocked day which finishes in the early afternoon. Many public secondary schools have now adopted this blocked-day timetable, and teenagers are free from about 3 p.m. every day. Grant-assisted and private schools, however, have classes until the early evening several days a week.

Homework

In primary school, homework is at the discretion of individual class teachers, but may be given from the first year of primary school onward. It is usually assumed that parents will be involved in helping children with their homework, and parents who are unable to do this for any reason sometimes pay for tutors to help their children for an hour or so every evening.

At secondary school there is usually a fairly heavy load of homework and exam studying which require considerable sacrifice and self-discipline on the part of students who wish to do well at school.

b. Participant school: Institute for Secondary Education 'Monte Miravete', Torreagüera, Murcia, Spain (https://www.murciaeduca.es/iesmontemiravete/sitio/index.cgi).

4. ANALYSIS OF FINDINGS

a. Students survey

PART 1 - PROFILE.

The sample population that took part in this stage of the project and responded to the questionnaire were students of the Spanish Secondary Education of both sexes distributed among the four academic courses and different classes as presented in **Table 1**.

Overall, there were a total of 206 participating students of who 3 did not give their consent and stopped their participation and thus, the final total sample population was N=203. Of this total, six participants did not declare their sex (3%). We found that the sample population was composed by a slightly higher percentage of girls (51.7%) than boys (45.3%) (**Figure 1**). The age of the participants ranged from 12 y old up to 18 y old (**Figure 2**) although most of them laid in the range between 13 y old and 16 y old (mean age= 14.26 ± 1.25). There were not significant (NS) differences between boys and girls in the mean age (p=0.7) nor in the percentage distribution (Pearson Chi-Square=0.29).The students were similarly distributed across the four levels of ESO, i.e. 1º ESO, 2º ESO, 3º ESO and 4º ESO (**Figure 3**) (Pearson Chi-Square p=0.21).

Table 1.- Descriptive profile of the sample population of Spanish students participating in the survey (Secondary School Monte Miravete, Torreagüera, Murcia).

	Total N (%)	**Sex distribution, N (%)**		***p*-Value**
		Boys	Girls	-
Participants	206 (100)	-	-	-
Participants with consent	203 (98.5)	-	-	-
Sex not declared (I'd rather not say/ Other)	6 (3.0)	92 (45.3)	105 (51.7)	-
	197	92 (46.7)	105 (53.3)	
	Age distribution N (%)			
Ages	Total (203)	Boys (92)	Girls (105)	(p=0.10)[1]
12 y	13 (6.4)	2 (16.7)	10 (83.3)	
13 y	52 (25.6)	28 (54.9)	23 (45.1)	
14 y	48 (23.6)	25 (52.1)	23 (47.9)	
15 y	55 (27.1)	24 (47.1)	27 (52.9)	
16 y	30 (14.8)	10 (33.3)	20 (66.7)	
17 y	4 (2.0)	3 (75.0)	1 (25.0)	
18 y	1 (0.5)	-	1 (100.0)	
Mean ± SD	14.3 ± 1.3	14.2 ± 1.2	14.3 ± 1.3	(p=0.70)[2]
	Course/Class Distribution N (%)			
Course/Class	Total (203)	Male (92)	Female (105)	
1º ESO	48 (23.6)	22 (46.8)	25 (53.2)	(p=0.21)[3]
A	10 (20.8)	5 (55.6)	4 (44.4)	
B	14 (29.2)	5 (35.7)	9 (64.3)	
D	12 (25.0)	3 (25.0)	9 (75.0)	
F	12 (25.0)	9 (75.0)	3 (25.0)	
2º ESO	42 (20.7)	22 (53.7)	19 (46.3)	
B	17 (40.5)	9 (52.9)	8 (47.1)	
D	25 (59.5)	13 (54.2)	11 (45.8)	
3º ESO	57 (28.1)	29 (52.7)	26 (47.3)	
A	12 (21.1)	7 (58.3)	5 (41.7)	
B	14 (24.6)	6 (46.2)	7 (53.8)	
C	13 (22.8)	6 (46.2)	7 (53.8)	
D	18 (31.6)	10 (58.8)	7 (41.2)	
4º ESO	56 (27.6)	18 (34.0)	35 (66.0)	
A	24 (42.9)	10	14	

B	27 (48.2)	7	18	
C	5 (8.9)	2	3	

[1]: Pearson Chi-Square (ages); [2]: T- Student; [3]: Pearson Chi-Square (courses);

Figure 1

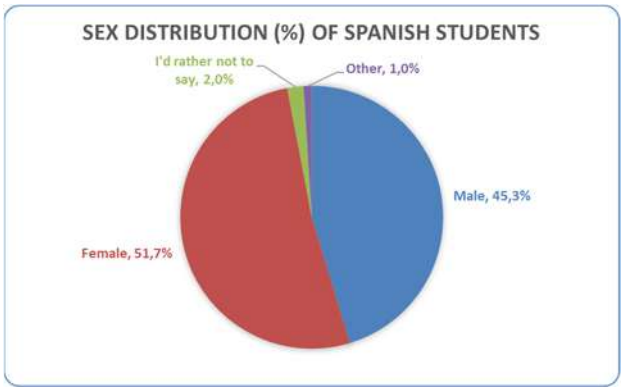


Figure 2

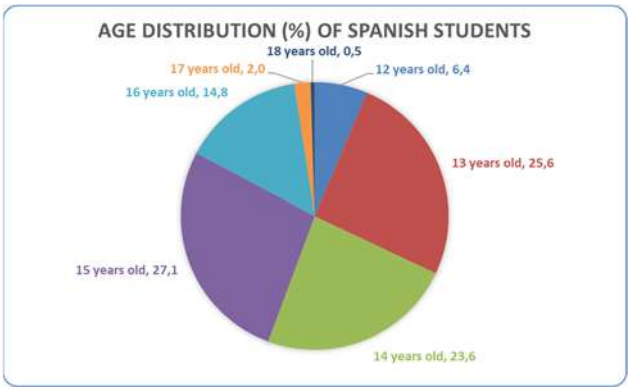
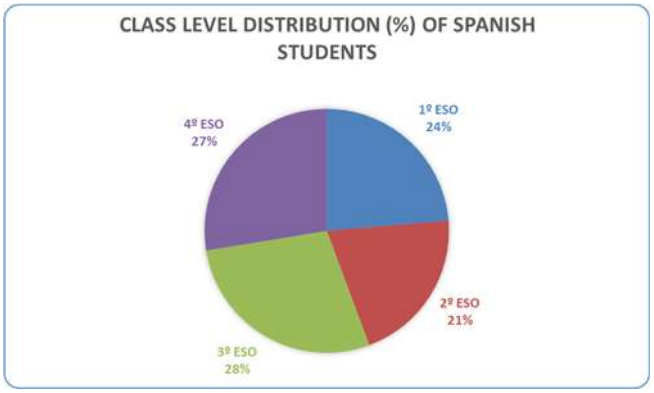


Figure 3

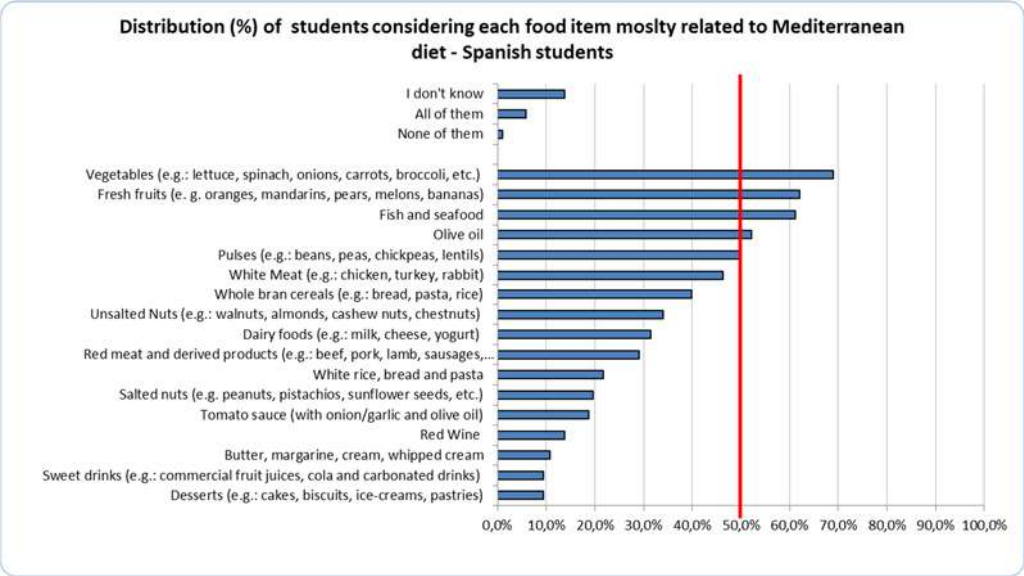


PART 2 - KNOWLEDGE.

Q4.- Which of the following foods do you think are more related with the Mediterranean diet? (multiple responses).

The % of valid responses of the whole sample population to Q4 are shown in **Figure 4**.

Figure 4



The results show that the food items most considered related with the MD by the students (>50%) were in order from more to less: Vegetables > Fruits > Fish/Seafood > Olive oil. They were followed by legumes > white meat > whole bran cereals (40 to 50% of the sample population). The remaining food items were related to MD by less than 40% of the sample population. Butter, desserts and sweet drinks appear at the bottom of the scale with few students relating these food items with the MD. Overall, it appears that there is some knowledge about MD main related foods.

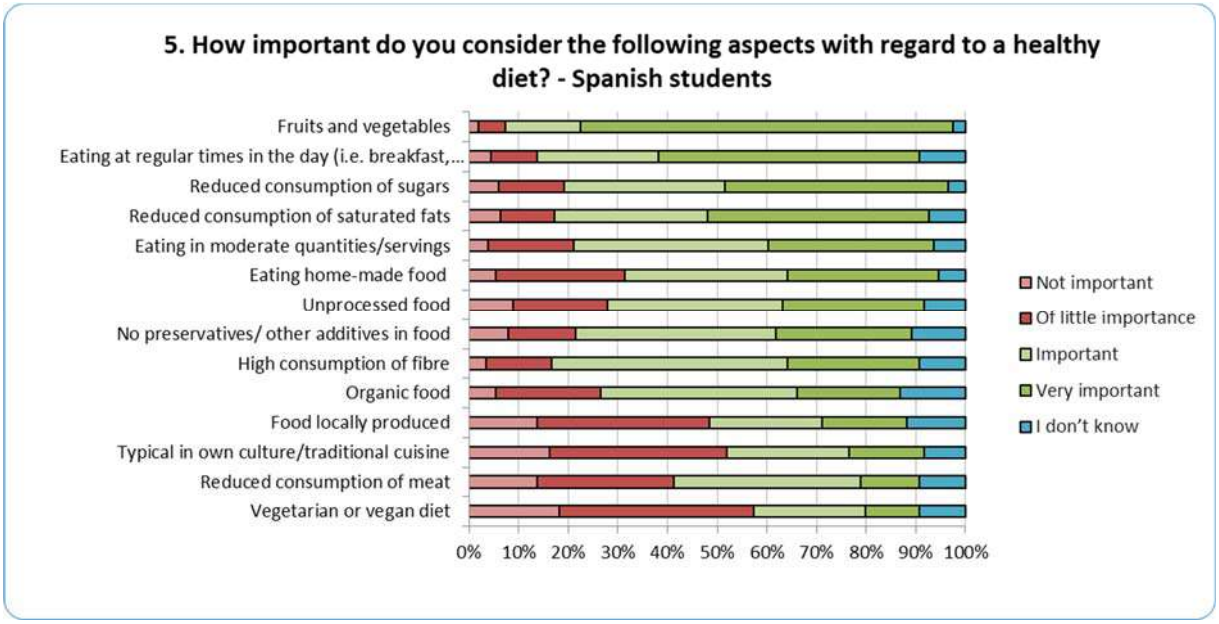
We found, however, that the consumption of red meat has a middle position above other typically Mediterranean products such as tomato sauce or red wine which appear to be less well known by the students. Also, still a considerable proportion of participants did not respond correctly and we noticed that some participants produced mixed responses, i.e. they considered relevant for the MD both white and red meat, or salted and unsalted nuts, etc. These results suggest either a lack of understanding of the question or a poor-to-modest knowledge of what foods are truly related with the MD.

Q5. How important do you consider the following aspects with regard to a healthy diet?

The global results to this question are presented in **Figure 5.** Only up to a maximum of ≈10% of the participants declared 'not to know' whether the different items had anything to do with a healthy diet and thus, ≈90% expressed an opinion about the importance of the items in a healthy diet. At the top of the list, 'Fruits and vegetables' and 'Eating at regular times…', were considered 'very important' by more than 50% of the sample population. They were followed by 'Reduced sugars', 'Reduced saturated fats', 'Eating moderate quantities', 'Eating home-made food', 'Unprocessed foods', 'No preservatives', 'High fibre' and 'Organic food' which were all considered as 'very important' or 'important' by >50% of the sample population. These results suggest a reasonable knowledge of some of the main messages associated with a healthy diet.

On the other hand, 'Vegetarian diets' and 'Traditional cuisine' were considered of little or no importance by >50% of the students whereas 'Local food production' and 'Reduced consumption of meat' were also considered of little or no importance by a considerable proportion of the sample population, nearly 50% and 40% of the sample population.

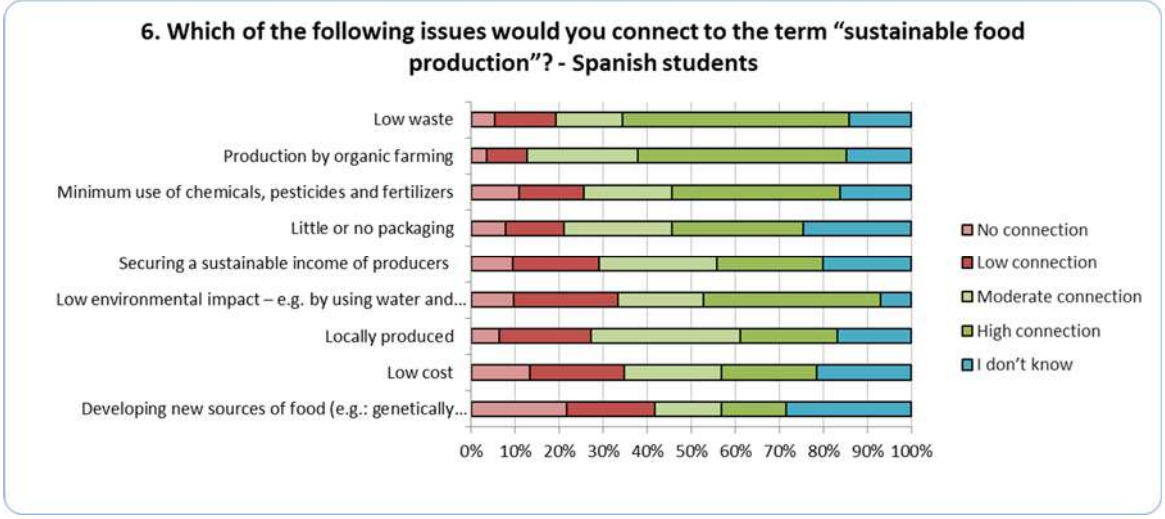
Figure 5



Q6. Which of the following would you connect to the term 'sustainable food production'?

Regarding the connection between the following selected items and the sustainability concept (**Figure 6**), ε50% of the sample of Spanish students found considerable connection (moderate to high) for most of the issues except for 'New sources of food' and 'Low cost'. At the top of the connection with 'sustainable production', the students considered 'Low waste', and 'Organic farming' as the most connected with sustainable production, followed by 'Minimum use of chemicals', 'Reduced packaging', 'Low environmental impact', 'Sustainable income' and 'Locally produced'.

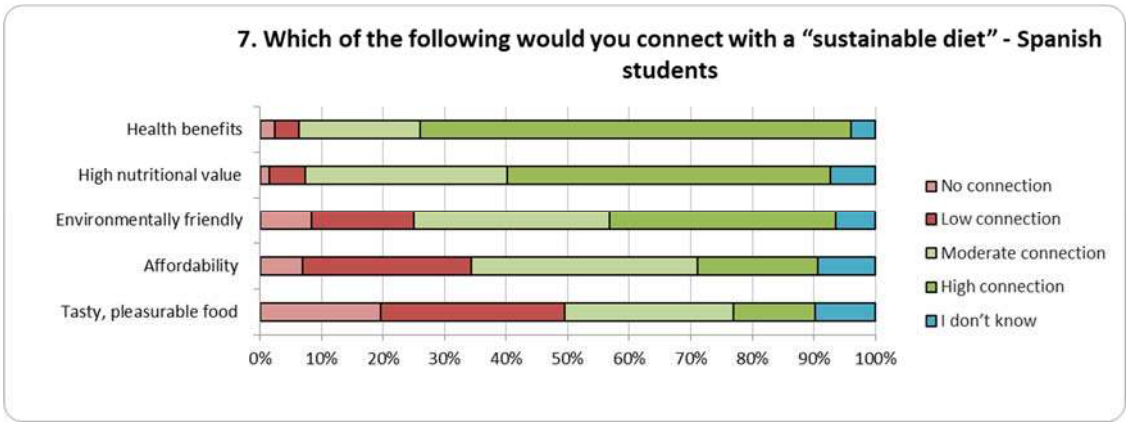
Figure 6



Q7. Which of the following would you connect with a "sustainable diet?

As with regard with the concept of 'sustainable diet' (**Figure 7**), the Spanish students considered the highest connection with the issues of 'Health benefits', 'High nutritional value', 'Environmentally friendly' and 'Affordability'. The hedonic component of food 'Taste and pleasure' was categorised as the least connected one.

Figure 7

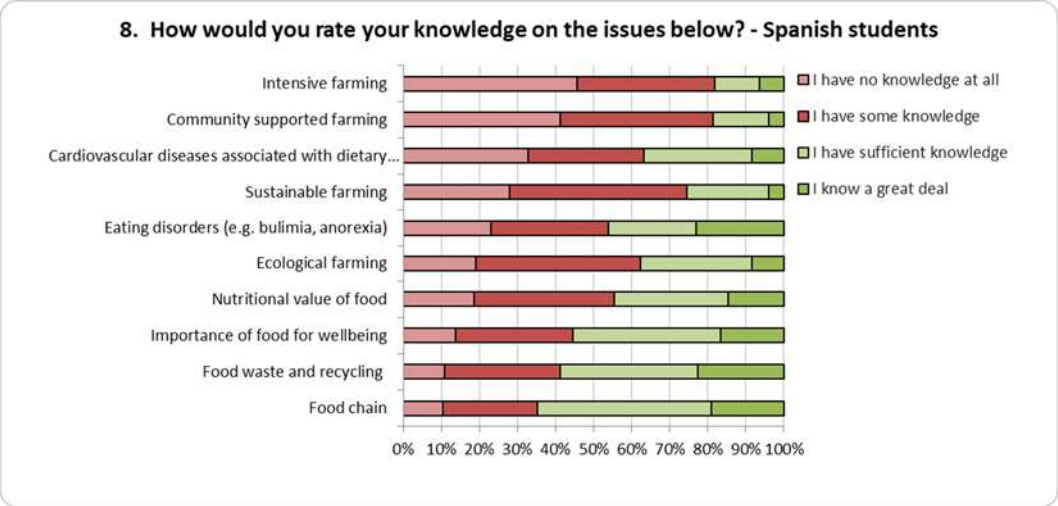


Q8. How would you rate your knowledge on the issues below?

Overall, the results of this question (**Figure 8**) show that the highest % of students indicated little or no knowledge on the issues related with different farming practices: 'Intensive farming', 'Community supported farming', 'Sustainable farming', 'Ecological farming' as well as on some specific issues related with health: 'Cardiovascular diseases and diet', 'Eating disorders', and

'Nutritional value of food'. On the other hand, they declared to have a better knowledge of the concepts of 'Food chain', 'Food waste & recycling' and of the 'Importance of food for wellbeing'.

Figure 8



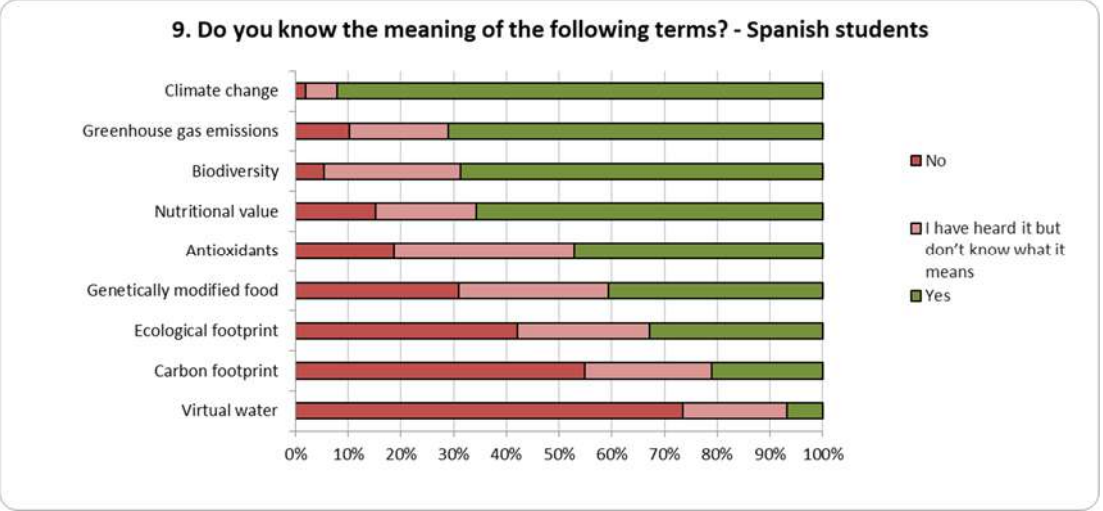
Q9. Do you know the meaning of the following terms?

In this question (**Figure 9**), the sample of Spanish students reported to have knowledge on the following issues from top to lowest: 'Climate change', 'Greenhouse emissions', 'Biodiversity', and 'Nutritional value'*.

**Regarding the results about 'Nutritional value', in this question, >60% of the students indicated to know the meaning of this concept but in the question before <50% declared to have some knowledge on the matter of 'nutritional value' which can indicate limited understanding of this important area.*

On the other hand, it was also clear from the results of this question that most of the students do not know well issues like 'Virtual water', 'Carbon footprint', 'Ecological footprint', or 'Genetically modified food'. The term 'Antioxidants' was also unknown by >50% of the students.

Figure 9



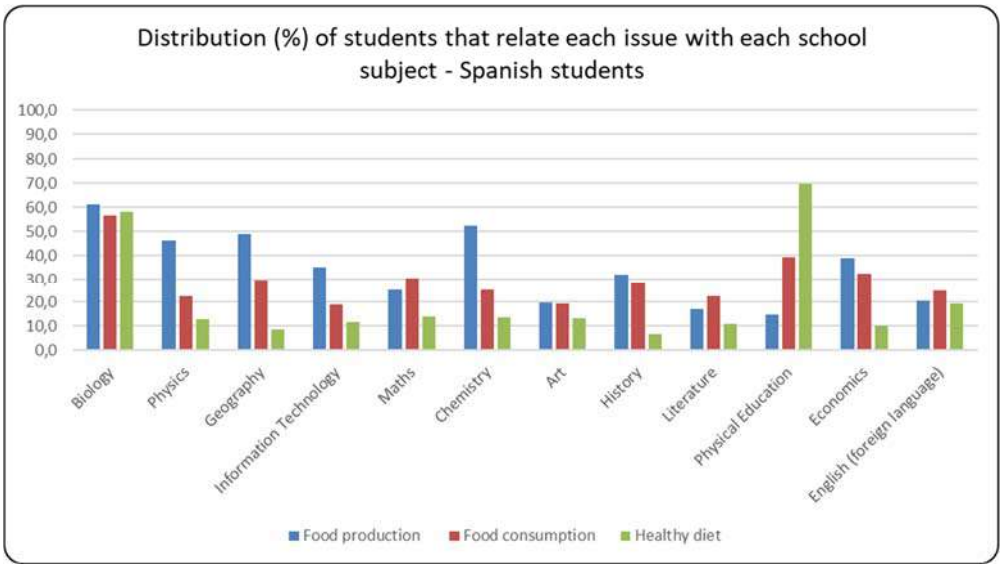
Q10. Which of the school subjects would you relate to the topics below?

With regards to what issues the students relate with the different curriculum subjects the following figure (**Figure 10**) shows that:

1) Food production is mainly related with 'Biology' and 'Chemistry', followed by 'Geography', 'Physics' and 'Economics'.
2) Food consumption is also mostly related with 'Biology' and 'Physical education'.
3) Healthy diet with 'Physical education' and 'Biology'.

Overall, the students consider 'Biology' as the subject mostly related with the three issues. Between 10 and 30% of the students have related the three concepts with all the subjects. 'Healthy diet' was, in general, the concept less related with any subject.

Figure 10

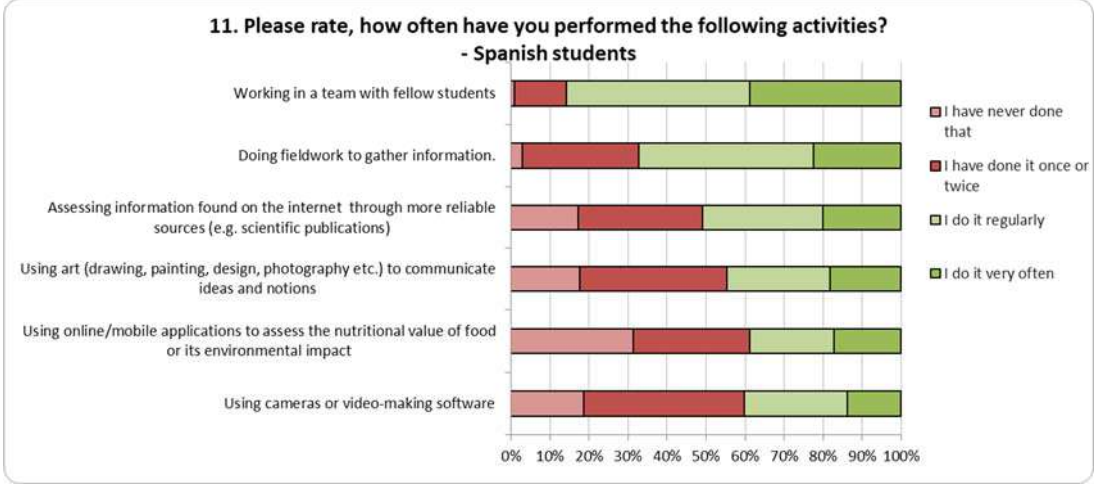


PART 3 - SKILLS.

Q11. Please rate, how often have you performed the following activities?

With regards to the experience of the students in performing school activities (**Figure 11**), the Spanish sample population declared to have performed either 'regularly' or 'very often' activities with a 'team of colleagues' and 'fieldwork to collect information'. Also, ≈50% of the students indicated to have used 'reliable sources of information'. On the other hand, they declared less experience in using 'On-line or mobile application to assess nutritional value', 'Cameras or video-making software' or 'Using art to communicate ideas'.

Figure 11



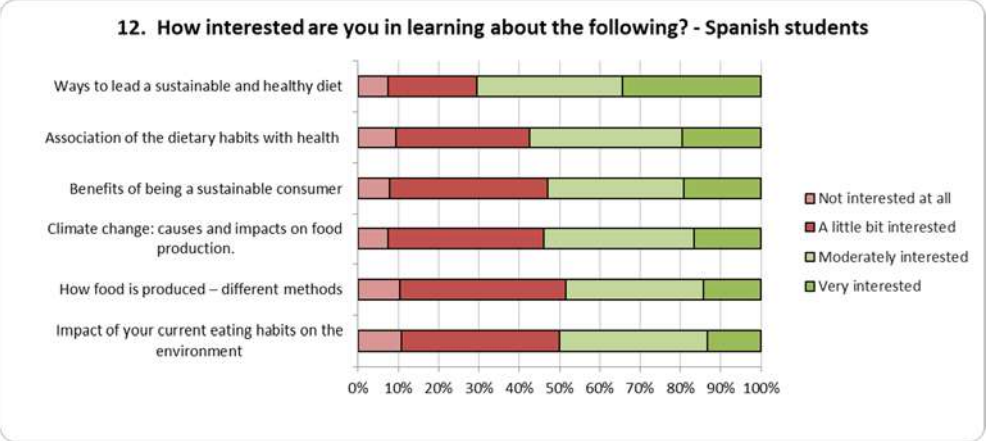
PART 4 - INTERESTS.

Q12. How interested are you in learning about the following?

The highest interest (moderate to very) of the Spanish students was in the 'Ways to lead a sustainable and healthy diet' (≈70%) (**Figure 12**). This was followed by 'Association of diet and health', 'Benefits of being sustainable' and 'Climate change' but there still were between 40-50% of the students no so interested in these matters. Around 50% of the students did not show so much interest in 'How food is produced' or 'Impact of their habits on the environment'.

Overall, the population was divided in two halves regarding the interest in these issues.

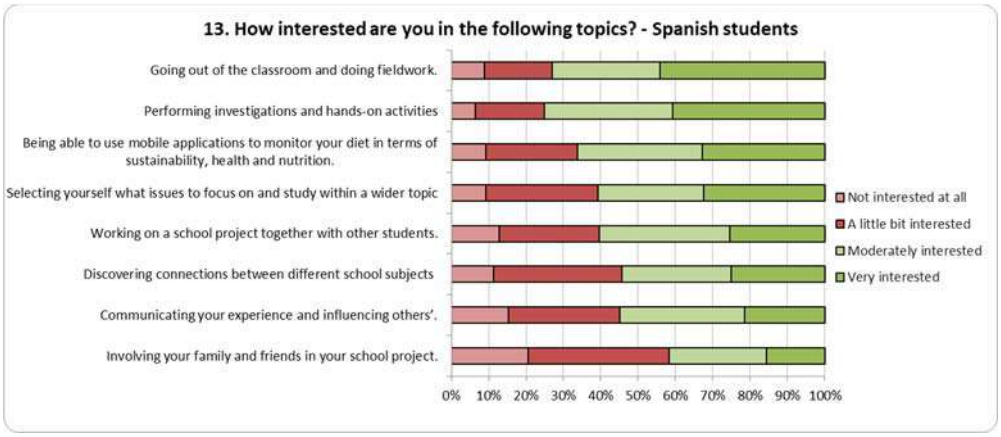
Figure 12



Q13. How interested are you in the following topics?

Regarding their interest in school activities (**Figure 13**), there was a general good interest in most of the activities, except for 'Involving the family and friends in the school project' (nearly 60% of the students indicated no or little interest). The maximum interest (>60% of the students) was shown for 'Performing investigation and hands-on activities', 'Doing fieldwork outside the classroom', 'Being able to use mobile applications…'. Overall, more than 50% of the participants showed interest in all the proposed activities.

Figure 13

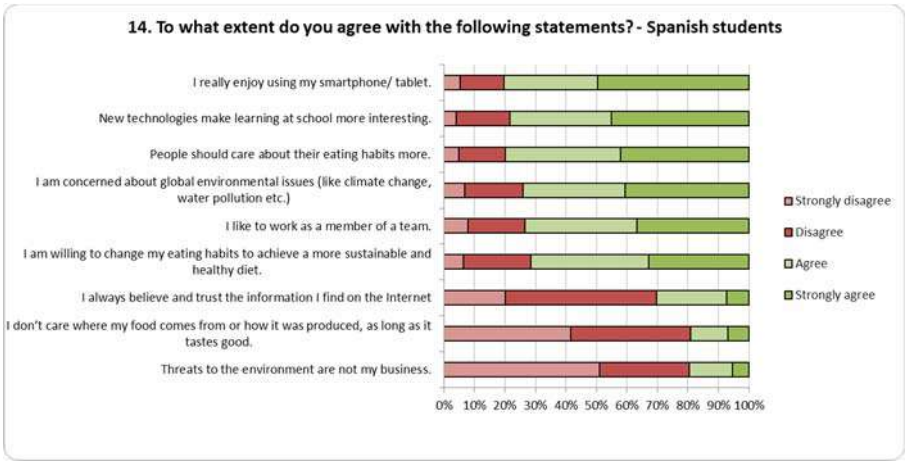


Q14. To what extent do you agree with the following statements?

There was also a rather high proportion of students (70-80%) who agreed on most of the proposed issues in Q14 (**Figure 14**), from top to lowest: 'Using smartphone/tablets', 'Using new technologies in interesting for learning', and 'People should care about their habits', followed by 'Concern about global environment', 'Working in a team' and 'Willingness to change habits to achieve a more sustainable and healthy diet'. In support of their interests, the students also highly disagree (70-

80%) in 'Always believe and trust Internet information', 'Food origin and production' or that 'The environment is not their business'.

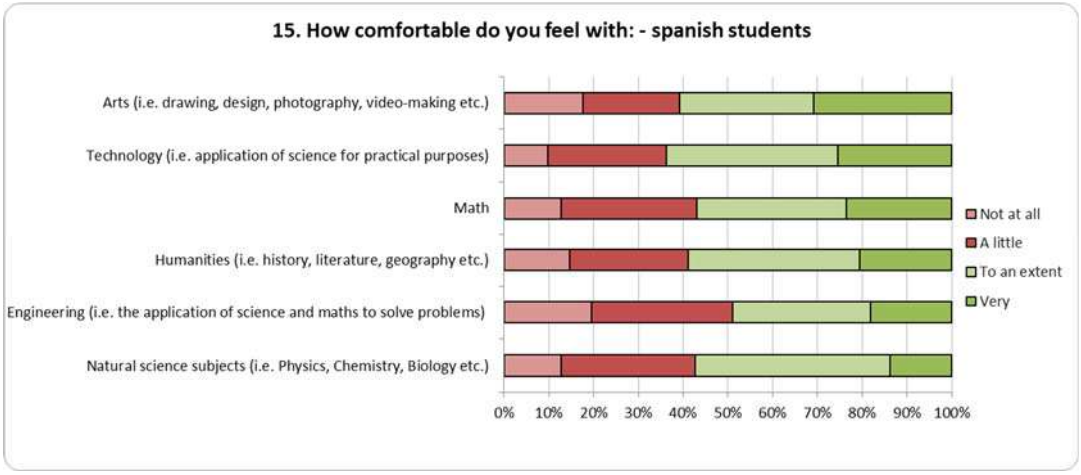
Figure 14



Q15. How comfortable do you feel with?

Regarding the preferences of the Spanish students in the different school areas of knowledge (**Figure 15**), the results clearly show that between 50 and 60% of the students reported to feel to an extent or very comfortable with the six areas in the following approximate order: Technology, Arts, Humanities, Math & Natural Sciences. On the other hand, the area of Engineering was little or no comfortable for ≈50% of the students.

Figure 15

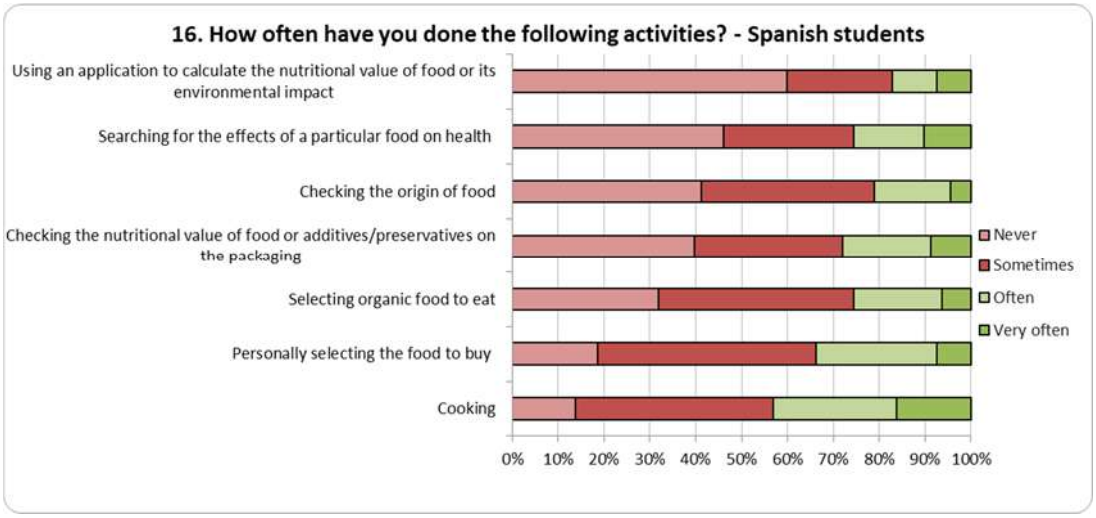


Q16. How often have you done the following activities?

Regarding their practical experience (**Figure 16**), it was clearly shown that a high proportion (nearly 60 to 80% of the participants) had none or little experience in most of the proposed activities. The highest percentage of students declaring some experience (often or very often doing those activities) was for 'Cooking' (approximately 40%) and or 'Personal selection of food'. The lowest experience was

indicated for 'Using nutritional or environmental mobile applications' and 'Checking the origin of food'.

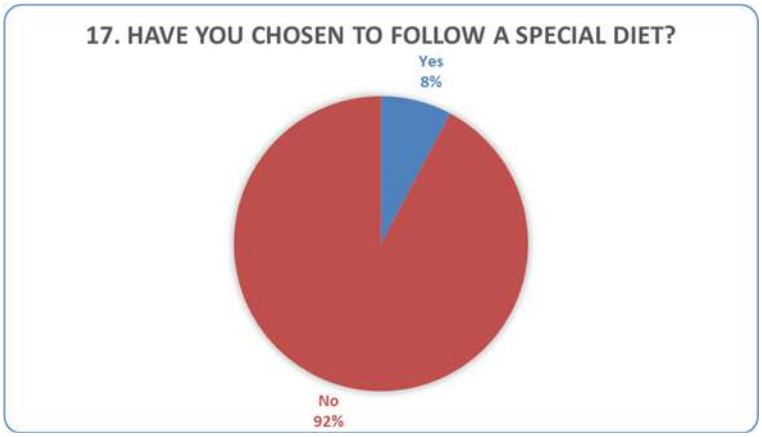
Figure 16



Q17. Have you chosen to follow a special diet?

Overall, the sample of Spanish students declared to follow a normal diet and only about 8% of them declared to have special diets (**Figure 17**).

Figure 17



The responses/comments of the students to the subsection of this question regarding the type of diet they followed indicated that most of them followed specific diet for religious reasons, followed by some who followed a vegetarian or vegan diet, a couple of pescatarian. It should be mention that also a few students declared to follow a diet high in protein because of their physical training in the gym or to reduce weight. One student declared to have a special diet because of food intolerance.

b. Teachers survey

PART 1 - PROFILE.

Overall, there were a total of 23 participating teachers who gave their consent. We found that the sample population was composed by a slightly higher percentage of women (51.7%) than men (45.3%) (Figure 1). Most of the teachers (47.8%) were between 45-54 years old, 26.1% were a bit older, between 55-64 years old and 17.4% were between 35-44 (Figure 2). Only two teachers (8.7%) were between 25-34 years old. Most of them (65%) teach in the different levels of ESO and Bachillerato with students between 12 and 18 years old, 21.7% teach in the last courses of ESO (3º or 4º ESO) and Bachilletato with students between 14-18 years old and 13% only teach in ESO (12-15 years old) (Figure 3). Six of the 23 teachers were specialized in Maths (26%) and three of them in Physical Education (13%) whereas 2 teachers were specialized in each of the following subjects: Geography/History, English, Technology, Language/Literature and Biology/Geology. Other subjects such as Economy, Music or Sciences were taught by only one teacher (Figure 4). Most of the teachers (56.5%) had more than 20 years of teaching experience (Figure 5).

Figure 1

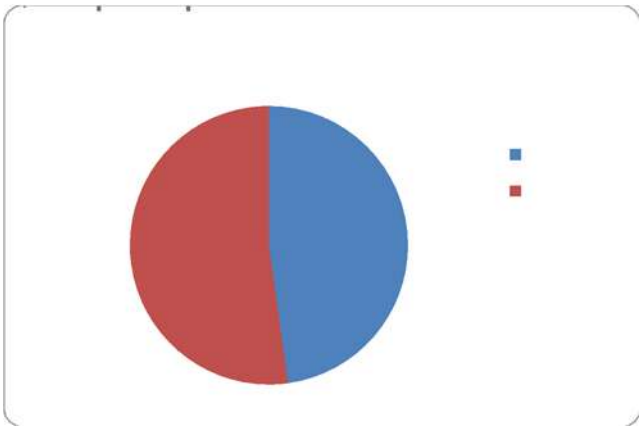


Figure 2

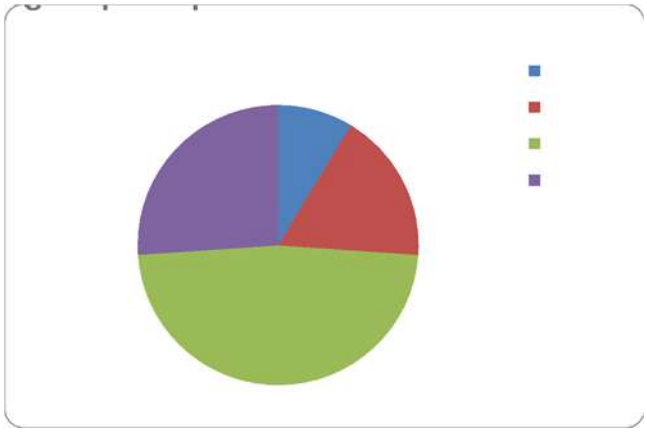


Figure 3

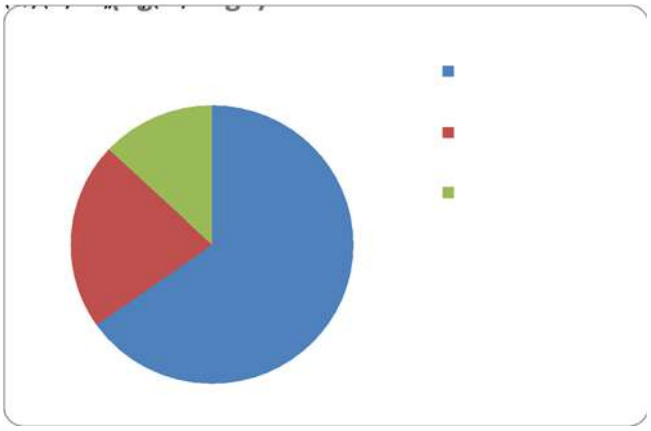


Figure 4

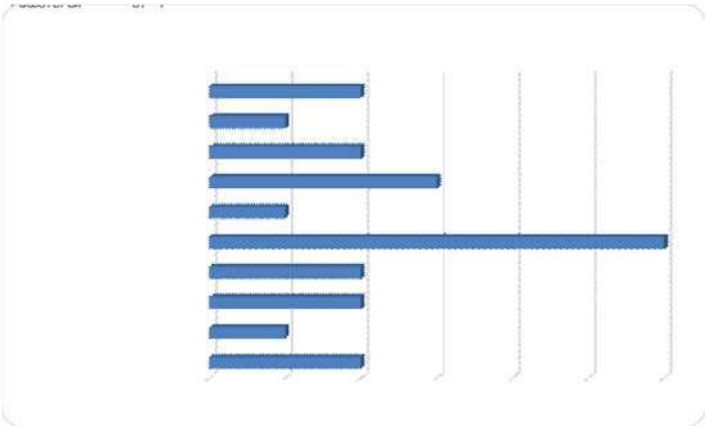
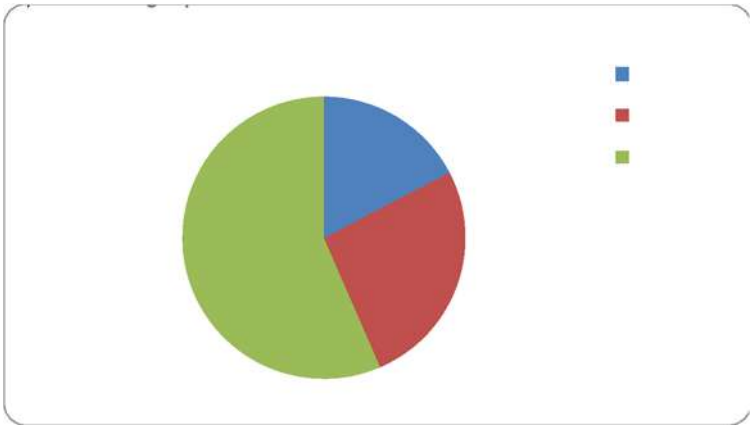


Figure 5

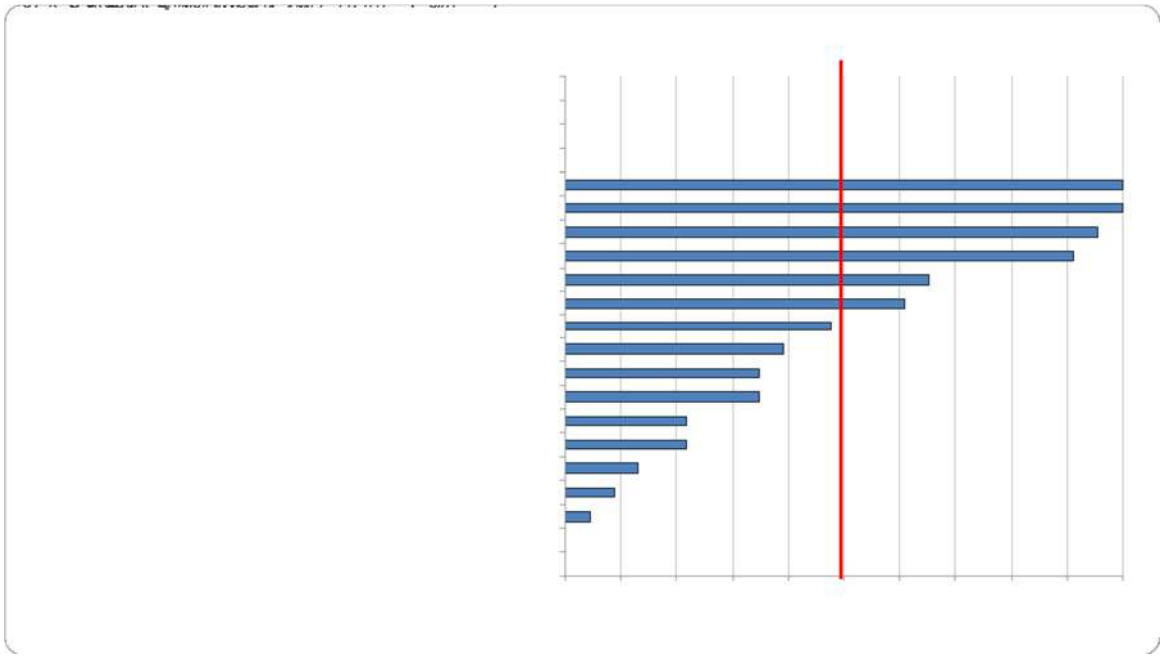


PART 2 - KNOWLEDGE.

Q7.- Which of the following foods would you mostly relate to the Mediterranean diet? (multiple responses).

The % of valid responses of the whole sample population to Q7 are shown in **Figure 6**.

Figure 6



The results show that the food items most considered related with the MD by the teachers (>50%) were in order from more to less: Vegetables > Olive oil > Pulses > Fresh fruits> Fish and seafood> White meat. The remaining food items were related to MD by less than 50% of the sample population. Butter, desserts and sweet drinks appear at the bottom of the scale with few or no teachers relating these food items with the MD. Overall, it appears that teachers have quite a bit of knowledge about MD main related foods.

Q8.- How important do you consider the following aspects with regard to a healthy diet?

The global results to this question are presented in **Figure 7.** At the top of the list, 'Fruits and vegetables', 'Eating home-made food' and 'Eating at regular times…', were considered 'important' or 'very important' by all the teachers. More of 50% of the population considered 'very important' the rest of the issues except 'Vegetarian diets' and 'Traditional cuisine' that were considered of little or no importance by 56 and 26% respectively. These results suggest a good knowledge of the main messages associated with a healthy diet.

Figure 7

Q9.- Which of the following would you connect with a "sustainable diet"?

Regarding the connection between the following selected items and the sustainability concept (**Figure 8**), ε50% of the Spanish teachers found high connection for most of the issues except for' 'Low cost' and 'New sources of food' that were considered without connection or low connection in 17 and 30% of the population, respectively.

Figure 8

Q10.- Which of the following would you connect to the term "sustainable food production"?

The Spanish teachers considered the highest connection with the issues of 'Environmentally friendly' and 'Health benefits'. Moderate and high connection was observed for 'Affordability' and 'High nutrition value'. The hedonic component of food 'Taste and pleasure' was categorised as the least connected one.

Figure 9

Q11.- How would you rate your knowledge on the issues below?

Overall, the results of this question (**Figure 10**) show that more than 50% of teachers indicated only some knowledge on the issues related with different farming practices: 'Intensive farming', 'Community supported farming', 'Sustainable farming', 'Organic farming'. On the other hand they declared to have sufficient knowledge in issues related with health: 'Cardiovascular diseases and diet', 'Eating disorders' and in 'Food waste & recycling' and even more knowledge in concepts such as 'Food chain' and 'Importance of food for wellbeing'.

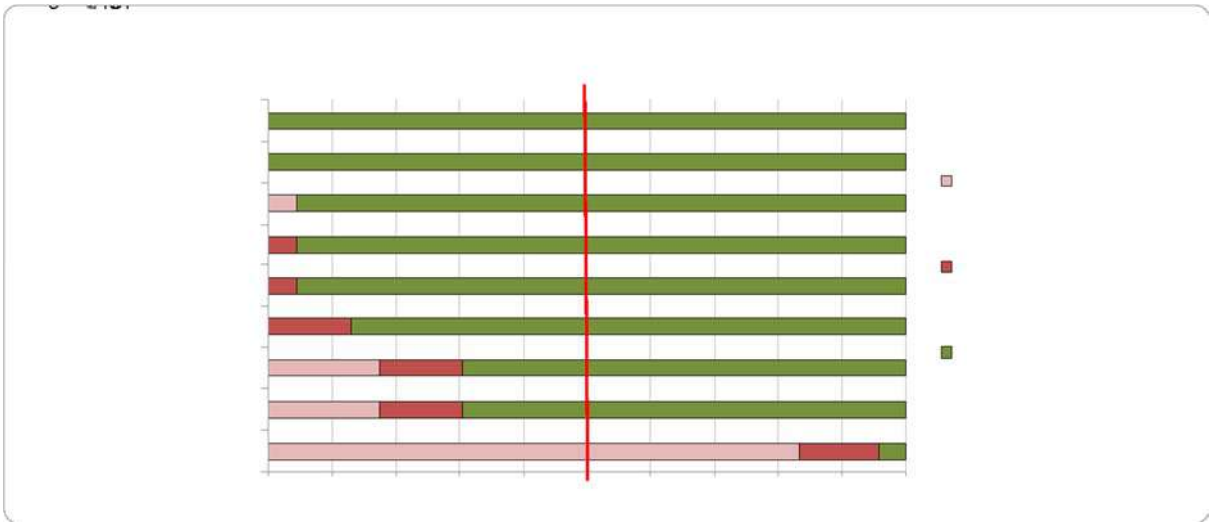
Figure 10

Q12.- Do you know the meaning of the following items?

In this question (**Figure 11**), all Spanish teachers reported to have knowledge on 'Climate change' and 'Greenhouse gas emissions' and also most of them in 'Nutritional value', 'Genetically modified food', 'Antioxidants' and `Biodiversity'. The terms 'Ecological footprint' and 'Carbon footprint' are known by 70% of the population although the remaining 30% still do not know them well.

On the other hand, it was also clear from the results of this question that most of the teachers do not know anything about the term 'Virtual water'.

Figure 11



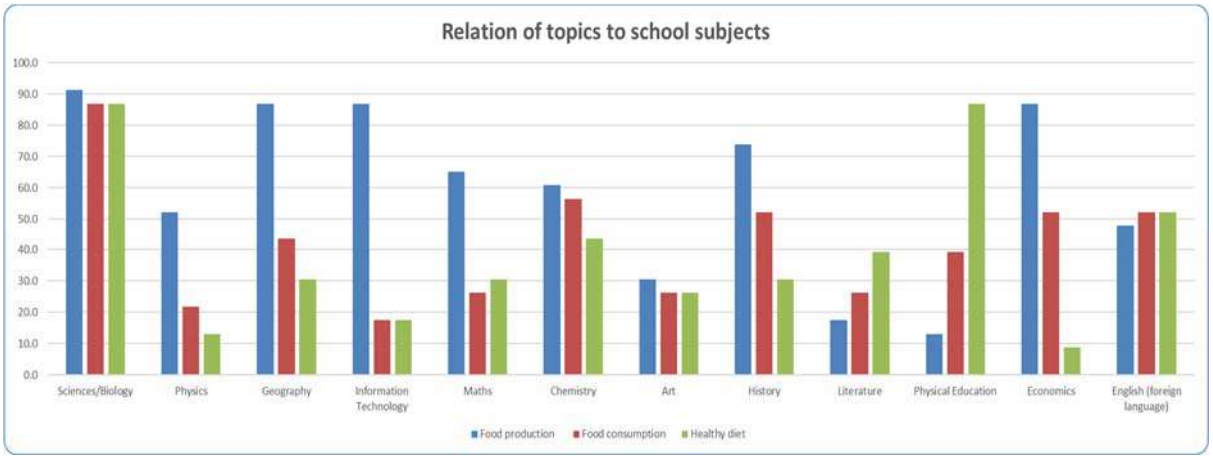
Q13. Which of the school subjects would you relate to the topics below?

With regards to what issues the teachers relate with the different curriculum subjects the following figure (**Figure 12**) shows that:

4) Food production is mainly related with 'Biology', 'Geography', 'Technology' and 'Economics' followed by 'History', 'Maths' and 'Chemistry'.
5) Food consumption is also mostly related with 'Biology' followed by 'Chemistry', 'History' and 'Economics' in the same level that 'English'
6) Healthy diet mainly with 'Physical education' and 'Biology'.

Overall, the teachers consider 'Biology' as the subject mostly related with the three issues, followed by 'Chemistry' and 'History'.

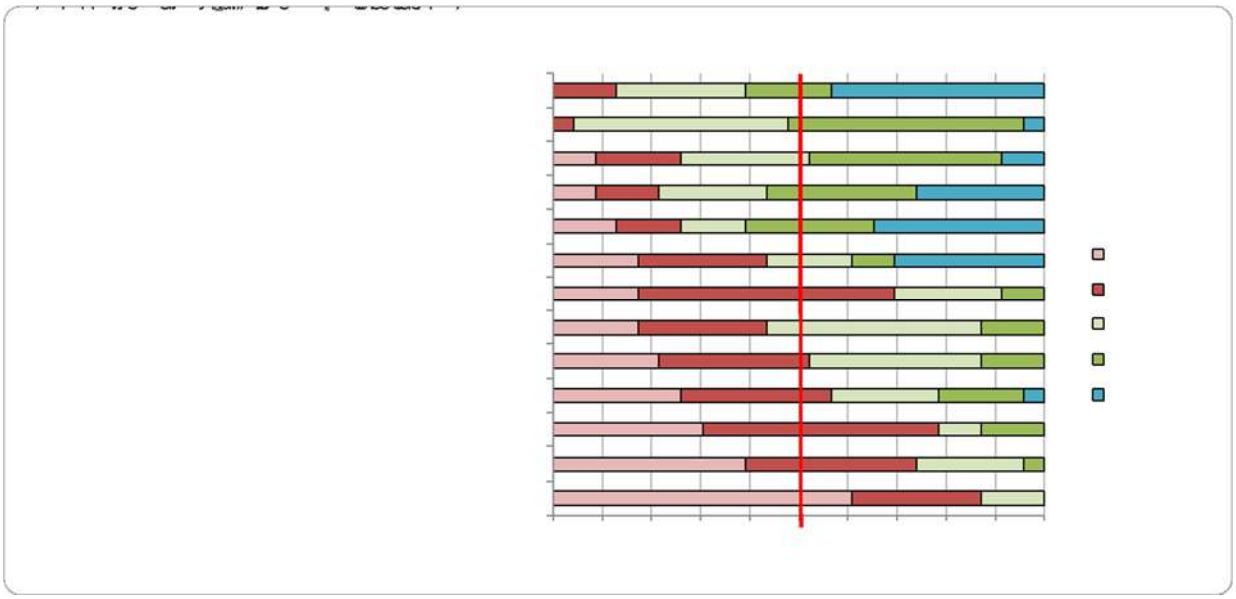
Figure 12



Q14. Please mark, to what extent the following statements express your opinion or knowledge or practice

In this question teachers´ knowledge and experience in STEAM is evaluated (**Figure 13**). More than 80% of the teachers have never used or only a little the STEAM methodology and more than 70% do not even know the meaning and application of this methodology. More than 50% have never or rarely implemented or taken part in the Inquiry-based learning approach and feel little or no familiar with this terminology. More than 40% feel little or no prepared to implement the STEAM methodology and 30% don't know if they are prepared. However, more than 60% would like to take part in project-based teaching and more than 91% think that teachers should be better prepared for cooperation among them and project-based learning. Although about half of the participants think that the implementation of STEAM methodology has many limitations in their school the other half don´t know about these possible limitations.

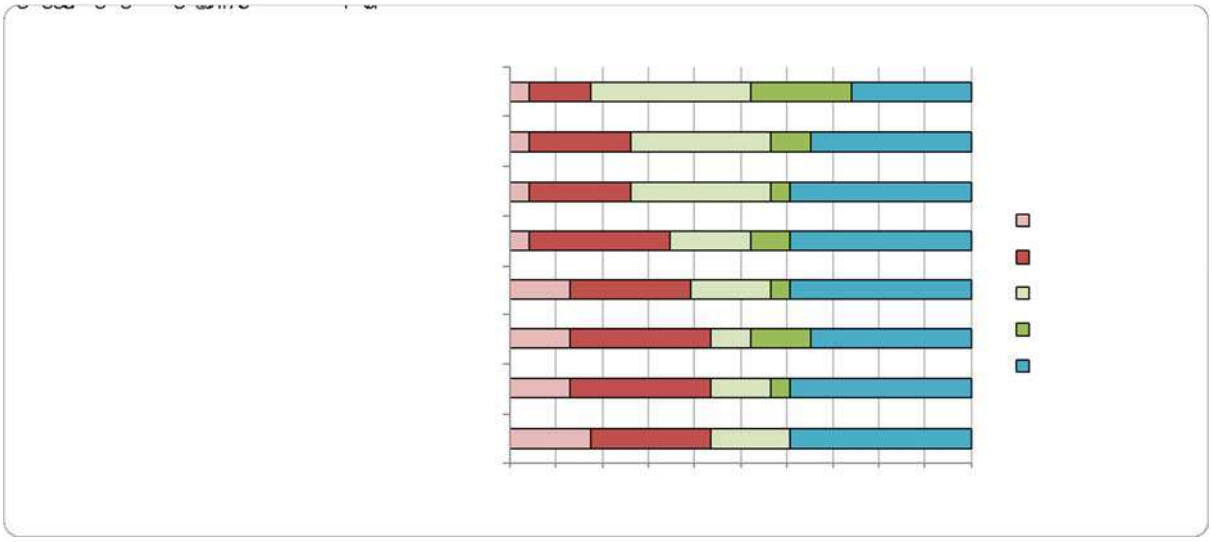
Figure 13



Q15. What do you think are the limitations/obstacles of implementing an integrated STEAM education in your school?

More than 30% have reported that they don´t know the influence of these limitations to implement STEAM methodology in their school. The main limitation reported for more than 50% of the teachers is the knowledge gaps about the methodology among teachers following by the lack of equipment into the school. The interest of teachers and student is not considered a limitation for more than 40% of the population. The organization of classes and the time to implement such a methodology are not considered a problem either for more than 40% of the teachers.

Figure 14

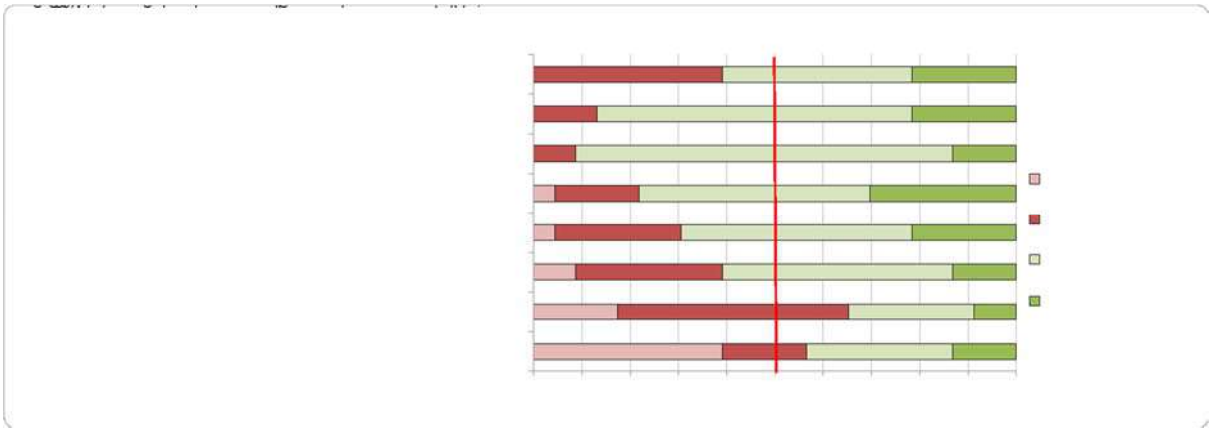


PART 3 - SKILLS

Q16. Please rate, how often have you performed the following activities?

More than 50% of the teachers have never or only once or twice used applications to monitor the nutritional value or sustainability of food or worked in collaboration with other teachers. The use of smartphone or tables and the fieldwork are not common activities for more than 40 % of the teachers. The most common activities (more than 80% do them regularly or very often) are guiding students to communicate opinions and ideas verbally and to keep deadlines. Working in teams and using text processing are activities followed for more than 70% of the teachers.

Figure 15



Q17. How interested are you in learning about the following?

In general, teachers show interest (moderately to very interested) for all the proposed items, especially in those related to sustainable and healthy diet.

Figure 16

Q18. Please mark, how interested are you in the following topics?

In general, all the teachers are moderately interested or very interested in all the topics related to STEAM methodology. Only 1 or 2 teachers are not interest at all in any item and between 3 and 6 (22-30%) were only a little bit interested. 78% of the teachers are interested in establishing a closer connection between the science subjects, in supporting students to communicate their findings and in doing fieldwork. In particular, less interest (30%) was observed in instructing the students in using online and mobile applications. Working with experts or in collaboration with other teachers was considered to be of little interest for 26% of the teachers.

Figure 17

Q19. To what extent do you agree with the following statements?

All teachers are concerned in more or less extent about global environmental issues and people eating habits and most of them are willing to change their eating habits. Around 82% like to work as a member of a team and think that new technologies are interesting to learn in the school and 74%

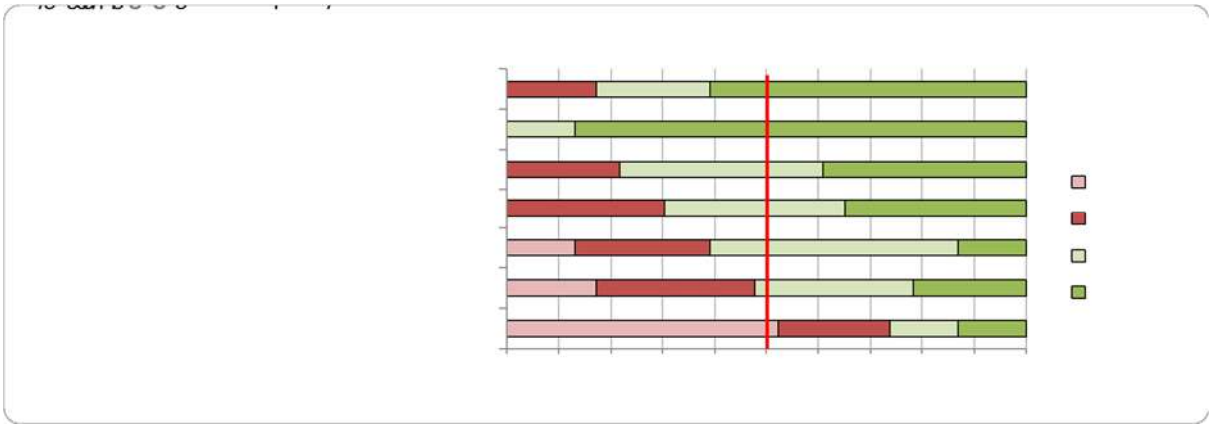
enjoy using smartphone and tables. Most of them (more than 87%) don't trust the information found in internet, care where their food comes and think that the threats to the environment are also their business.

Figure 18

Q20. How often have you done the following activities?

All teachers often or very often select personally the food to buy and most of them (82.6%) cook also often. More than 70% check often or very often the origin of the fruit and its nutritional value on the packaging. More than 40% never or only sometimes select organic food to eat or search the health beneficial effect of a particular food and more than 50% never has used an application to calculate the nutritional value of food or its environmental impact.

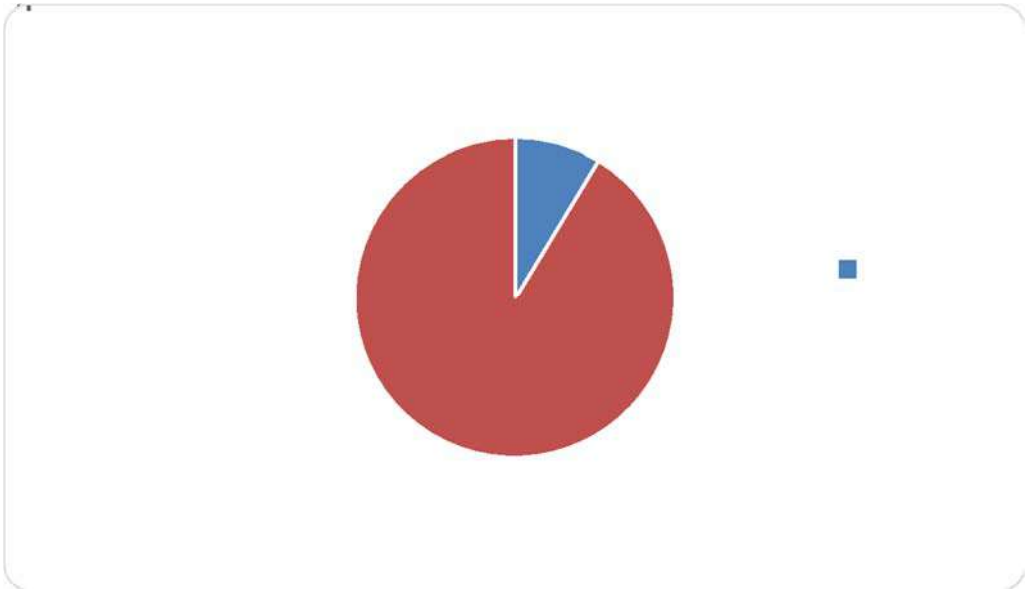
Figure 19



Q21. Have you chosen to follow a special diet?

Overall, the sample of Spanish teachers declared to follow a normal diet and only about 8.7% of them declared to have special diets (**Figure 20**). One teacher follow a diet without gluten and other has a special diet because of the diabetes.

Figure 20



SUMMARY

Table 2 and **Table 3** presents a summary of some of the main outcomes of the Learning Needs questionnaire responded by the Spanish students and teachers participating in this project, respectively.

Overall, the students seem to have a considerable interest in the two main project themes, Healthy and Nutritional Diet & Climate Change and Environmental Problems. Regarding the healthy diet, the students seem to have some general acceptable knowledge on some of the healthiest items such as fruits and vegetables, reduced carbohydrates and fats in the form of sweet desserts and beverages, or the preference of olive oil against butter. Some food items may need reinforcement such as the consumption of meat, legumes, fibre. The also students indicate a great interest in the Nutritional and Health value of foods, changing to better habits and on the application of new technologies and apps to learn more about these issues but they don't seem to have much experience on it. A similar situation occurs with the sustainability theme. However, local food, traditional recipes and relatives' involvement should be strongly considered for the planning of the activities. The issue of taste and pleasure can also be explored. In addition to the new technology and applications, the areas of Art, Literature and English may also be included in the activities.

The teachers have, in general, a better and wider knowledge of the different issues related with food, health, and sustainability but some specific items are less known such as tomato sauce, red wine, vegetarian diets regarding diet, and the issues of virtual water and new foods regarding sustainability. The relevance of the hedonic component of food is not well understood either. The teachers are keen and interested in the proposed activities They have done project related activities with the students and promoted the use of fieldwork, specific software, and of communication but, they have little experience in STEAM, working in collaboration with other teachers and in the application of specific Apps to search for nutrition and health issues.

Table 2.- Summary of the general knowledge, skills and interests of the sample population of Spanish students (Secondary Education, Institute Monte Miravete, Murcia, Spain) based on the % responses.

GOODFOOD Main Themes				
Themes	**Better Knowledge/Skill/Interests (>50%)**	**Medium Knowledge/Skills/Interests (≈50%)**	**Poorer Knowledge/Skills/Interests (<50%)**	**Probably need some reinforcement (Ideas to focus on for the activities?)**
1. Healthy Diet & Nutritional value	Fruits + Vegetables, Fish; Olive oil; Butter, Sweets drinks, Desserts; Reduced sugars; Reduced saturated fats; Eating Moderate quantities and regularly; Home-made; Unprocessed; No additives; High fibre; Importance of food for wellbeing; Nutritional value; Healthy diet; Caring about eating habits; Changing habits	Red meat; Legumes; Reduced consumption of meat Food selection; Cooking	Tomato sauce; Red wine; Whole brans; Unsalted nuts Vegetarian diets; Diseases associated with diet; eating disorders; Nutritional value; Antioxidants	➢ Red meat vs White meat/Fish vs Legumes ➢ Whole bran (high fibre) vs white products (low fibre) ➢ Nutritional value ➢ Vegetarian diet (?)
2. Sustainability	Low waste; Organic farming and Organic foods; Minimum chemicals and packaging; Low environmental impact; Locally produced; Food waste and food chain Climate change; Biodiversity; Greenhouse emissions;	Income for producers; Affordability/Accessibility Food production; Impact of eating habits; Sustainable consumers	Traditional cuisine; Local production; Low cost New sources of food; Genetically modified food Intensive, Community-based, Ecological farming Ecological footprint; Carbon footprint; Virtual water	➢ Traditional cuisine and local production
3. Hedonic component	-	-	Tasty & pleasurable food	➢ Importance of the relationship between pleasure and a healthy/sustainable diet
School activities				
	Better Knowledge/Skill/Interests (>50%)	**Medium Knowledge/Skills/Interests (≈50%)**	**Poorer Knowledge/Skills/Interests (<50%)**	**Probably need some reinforcement (Ideas to focus on for the activities?)**
School Subjects	Healthy diet: Biology, Physical Education (PE); Food production: Biology, PE, Geography, Physics, Economy	Food production and food consumption widely related to more subjects but in low proportion	Art; Literature; English Healthy diet less related with the rest of subjects	➢ Art, Literature and History vs Healthy diet

				➢ English as a communication tool in Science? ➢ Technology vs Food production and consumption
School Activities	Working on a team; Field work; Investigation; Selecting project and Connecting subjects Use Mobile Apps; Communication; New technologies; Smart phones and Tablets; Technology; Arts, Humanities, Natural Sciences and Maths	Scientific assessment of information Engineering	Art; Mobile Apps; Cameras-Video software Involving your family & Friends	➢ New Tech and Apps, ➢ Use of Mobile, Tablets, Video-making ➢ Promote the participation of relatives

Table 3.- Summary of the general knowledge, skills and interests of the sample population of Spanish teachers (Secondary Education, Institute Monte Miravete, Murcia, Spain) based on the % responses.

GOODFOOD Main Themes				
Themes	**Better Knowledge/Skill/Interests (>50%)**	**Medium Knowledge/Skills/ Interests (≈50%)**	**Poorer Knowledge/Skills/Interests (<50%)**	**Probably need some reinforcement (Ideas to focus on for the activities?)**
4. Healthy Diet & Nutritional value	High interest Top: Vegetables, Olive oil; Legumes; Fruits; Fish; White meat Bottom: Butter, Desserts; Sweets drinks; Red meat; Salted nuts Reduced sugars; Reduced saturated fats; High fibre; Reduced meat; Eating Moderate quantities and regularly; Home-made; Unprocessed; No additives; Un processed food; High fibre; Organic food; Local production; Traditional cuisine Food for wellbeing; Nutritional value; CVD and eating disorders; Healthy diet; Antioxidants; Caring about eating habits; Changing habits		Tomato sauce; Red wine; Whole brans; Vegetarian diets;	➢ Tomato sauce ➢ Red wine (?) ➢ Vegetarian diets (?)

5. Sustainability	High-interest Minimum chemicals and packaging; Organic farming; Low environmental impact; Low waste; Locally produced; Sustainable income; Low cost Environmentally friendly; Health benefits; Affordability/Accessibility Nutritional value; Food waste and food chain Intensive, Community-based, Sustainable farming Ecological footprint; Carbon footprint; Climate change; Genetically modified food; Biodiversity; Greenhouse emissions;	New sources of food;	Virtual water	➢ New sources of food
6. Hedonic component	-	-	Tasty & pleasurable food	➢ Importance of the relationship between pleasure and a healthy/sustainable diet
School activities				
	Better Knowledge/Skill/Interests (>50%)	**Medium Knowledge/Skills/Interests (≈50%)**	**Poorer Knowledge/Skills/Interests (<50%)**	**Probably need some reinforcement (Ideas to focus on for the activities?)**
School Subjects	Healthy diet: **Biology**, Physical Education (PE); English Food production: **Biology**, Geography, Technology, Economy, History, Maths, Chemistry Food consumption: **Biology**, Chemistry, History, Economy, English	Food production is widely related to more subjects	Art; Literature; Physics less related to the themes Healthy diet less related with the rest of subjects	➢ Art, Literature ➢ English as a communication tool in Science?
STEAM, IBL Activities	High interest in performing all the activities Smart phones and Tablets; Software; Guiding students to communicate, to work in teams; to deadlines, to investigate (fieldwork)	IBL Collaborative work (teachers, students)	STEAM Low experience and Knowledge Doubts about their use and need Limited knowledge of the limitations and problems of implementing STEAM Collaborative work; Apps for Nutritional value	➢ STEAM protocols ➢