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## An investigation into the Greek secondary school graduates' knowledge and awareness of healthy diet and nutrition

### Una investigación sobre el conocimiento y conciencia en dietas sanas y nutrición de los estudiantes griegos de enseñanza media

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#### Abstract

*The aim of this study was to assess Greek secondary school graduates' knowledge of healthy diet, and the factors that could affect it. Our results show that, to a large extent, students know what healthy food is. They lack however satisfactory knowledge on the chemical constitution of foods. Although family plays a major role in influencing their dietary habits, their main information source, on dietary matters, is television, with school to a lesser extent. Finally students believe that school could extend its influence in the shaping of their dietary patterns through suitable educational programmes.*

**Key words:** diet, students, health, school

#### Resumen

*El objetivo de este estudio es evaluar el conocimiento que tienen los estudiantes griegos graduados de enseñanza media sobre dietas sanas y los factores que pueden afectarlas. Los resultados muestran que, en general, los estudiantes saben lo que es comida sana. Sin embargo, no poseen un conocimiento satisfactorio sobre la constitución química de los alimentos. Aunque la familia juega un papel primordial e influencia sus costumbres alimenticias, las fuente más importantes de información sobre materias dietéticas son la televisión y, con menos relevancia, la escuela. Finalmente, los estudiantes creen que la escuela podría influir más y afectar sus costumbres dietéticas a través de programas educacionales adecuados.*

**Palabras clave:** dieta, estudiantes, salud, escuela.

#### INTRODUCTION

Diet is a major factor of importance for public health. Researchers agree that a relationship exists between diet and chronic disease, but converting the research into changes in dietary behaviour poses a challenge (National Research Council, 1999; Healthy People, 2000). Originating in childhood and influenced by cultural background, eating habits remain resistant to change without long-term commitment (GRITZ and BASTANI, 1993).

Several factors influence eating habits. Children's and young adults' food preferences resemble their parents' (PLINER and PELCHAT, 1986; ROZIN *et al.*, 1984). The probability of engaging in health-risk behaviours is less influenced by parental presence and authoritative parenting practices (FORS *et al.*, 1999; JACKSON *et al.*, 1994). However, limited evidence demonstrates the influence of parents on specific eating behaviors other than as a role model (WOODWARD *et al.*, 1996), physical monitoring of intake (HILL *et al.*, 1998), providing the food, or giving nutrition advice (HILL *et al.*, 1998). Due to the important relationship between diet and health, avenues to effectively facilitate consumption of healthy foods are essential.

NEUMARK-SZTAINER *et al.*, (1996) have demonstrated a strong association between fruit and vegetable intake and family connectedness. YOUNG and FORS, (2001) confirm these findings and add important factors such as

hours spent at home without an adult and the parental situation of the adolescent. They also found that as the grade increases so does the percent of students who do not eat healthy foods as they get older.

MURPHY *et al.*, (1994) found that students are interested in learning about nutrition with a personal effect on their own health and well being. Their interests varied somehow by grade, but topics of weight control, nutrition and disease, and how to improve their diet were of particular interest across all grades. They also found that across grade levels student's preferred active rather than passive methods of learning about nutrition. Teachers therefore need to find ways to allow students to be active participants in nutrition instruction, and to provide opportunities for students to apply learning through doing. Finally it was found that students prefer to learn through interdisciplinary or team teaching. KEIRLE and THOMAS (2000) confirm these findings with their investigation where they conclude that comprehensive health education programmes contribute significantly to the students' knowledge and behaviour to diet. However, other personal and socioeconomical factors could also influence students' knowledge and behavior to eating habits.

In the present study we assessed the dietary habits of Greek secondary school graduates (of both sexes) and the factors that might influence them.

#### METHODOLOGY APPLIED IN THE INVESTIGATION

##### Subjects

In the study participated 346 Greek secondary school graduates (172 boys and 174 girls) who gained entrance into the first year of University.

##### Methodology

A questionnaire consisting of 12 questions was constructed for the specific needs of the present study (Appendix I). The questionnaire required the students to indicate what they eat, what is a healthy diet, their knowledge of the chemical constitution of different kinds of food, how and where from they gained knowledge about the different foods etc.

Our data were statistically analyzed using  $\chi^2$ . For all statistical analyses, a level of at least 0.05 was used to determine significance.

#### RESULTS AND DISCUSSION

##### 1. Results

##### Actual dietary habits of students

1) To the first question *how often do you consume the foods of the following list*, for *every day* 51.6% answered they eat yoghurt and milk, 49.4% olive oil, 49.1% bread, 48% cheese and butter, 32.5% fruits, 29.8% vegetables, 27% sweets; for *twice or three times a week* 52.3% answered potatoes, 52.1% pasta, 43.3% eggs and chicken, 39.8% sweets, 37.6%

meat, 36.6% vegetables and 36.6% cheese and butter. 66.5% of our sample consume fish *once a week*. Also once a week 54.7% pulses, 50.3% meat, 49.5% eggs and chicken, 43% delicatessen, 42.7% potatoes, and 42.2% pasta. For *never*: 48% answered they consume seed oil, 42.5% snacks, 26.6% pulses, 22.7% fish, 20.7% delicatessen, 12% meat and 7.3% fruits. For more details see table 1.

Table 1.. (% of students)

How often do you consume the foods of the following list?

Food	Every day	2-3 times a week	Once a week	Never
Bread	49.1	34.2	14.1	2.7
Olive oil	49.4	34.0	12.0	4.7
Seed oil	2.8	21.4	27.6	48.0
Potatoes	3.4	52.3	42.7	1.4
Sweets	27.0	39.8	28.4	4.7
Snacks	2.6	19.3	35.3	42.5
Delicatessen	5.4	30.9	43.0	20.7
Meat	0.0	37.6	50.3	12.0
Chicken, Eggs	2.7	43.3	49.5	4.7
Fish	0.0	10.7	66.5	22.7
Vegetables	29.8	36.6	28.6	4.8
Pasta	3.4	52.1	42.2	2.0
Pulses (dried beans, lentils, chick peas etc)	0.0	18.0	54.7	26.6
Fruits	32.5	35.1	25.0	7.3
Milk, yoghurt	51.6	32.9	12.8	2.7
Cheese, butter	48.0	36.6	10.7	4.7

2) To the question *please describe everything you ate yesterday in detail*: 70% answered milk and cereals *for breakfast*, *in between* 61% answered sandwiches, 65% have a proper meal *for lunch*, 26% have a sandwich *in the afternoon* and 30% have a proper dinner *in the evening*. Breakfast is the most popular meal with lunch been second (figure 1).

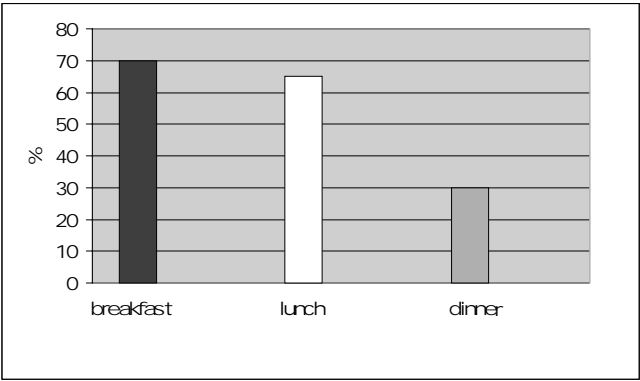


Fig.1 Please describe everything you ate yesterday in detail

3) To the question: *what are the criteria for choosing a kind of food*, 47.5% use taste as criterion, 44% choose it if it is healthy, 28.5% for reasons of controlling their weight (figure 2).

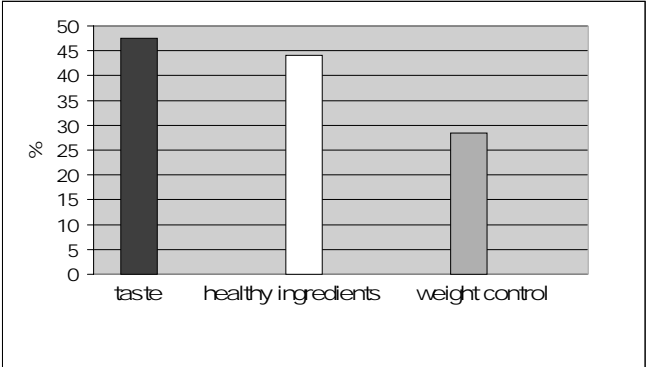


Fig.2 Criteria for choice of food

4) To the next question: *where do you prefer to eat* 85.1% answered at home.

Understanding healthy diet

5) When asked: *what healthy diet means for you?* 78.5% answered “a balanced diet but with more emphasis in vegetables and less in meat”.

6) To the sixth question: *among the categories of food listed below which do you think we should prefer to eat?* From the *first category* 97.9% said olive oil and 12.8% butter. From the *second category* 51.3% answered white sugar, 20% artificial sweetener and 13.5% brown sugar. From the *third category* 63.5% prefer pulses, 39.1% brown bread, 37.8% pasta, 29% potatoes and 23.6% white bread. From the *fourth category* 68.9% said fish, 57.4% chicken, 33.7% beef and 17.5% lamb. Finally from the *fifth category* 64.1% prefer fresh fruits while 39.8% prefer fresh fruit juice (figure 3).

1 <sup>st</sup> set of columns	2 <sup>nd</sup> set of columns	3 <sup>rd</sup> set of columns
olive oil 97.9% butter 12.8%	white sugar 51.3% artificial sweetener 20.0% brown sugar 13.5%	pulses 63.5% brown bread 39.1% pasta 37.8% potatoes 29.0% white bread 23.6%
4 <sup>th</sup> set of columns	5 <sup>th</sup> set of columns	
fish 68.9% chicken 57.4% beef 33.7% lamb 17.5%	fresh fruits 64.1% fresh fruit juice 39.8%	

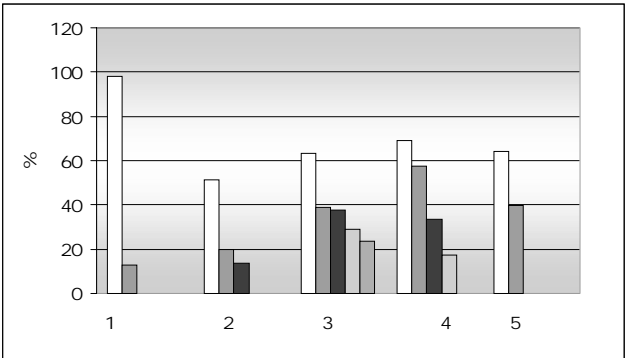


Fig.3 Categories of preferred food (%)

7) To the question: *your knowledge about diet comes from*: 83% answered “television”, 54.7% “school”, 46% “magazines”, 25.7% “advertisements” and 22.3% “newspapers” (figure 4).

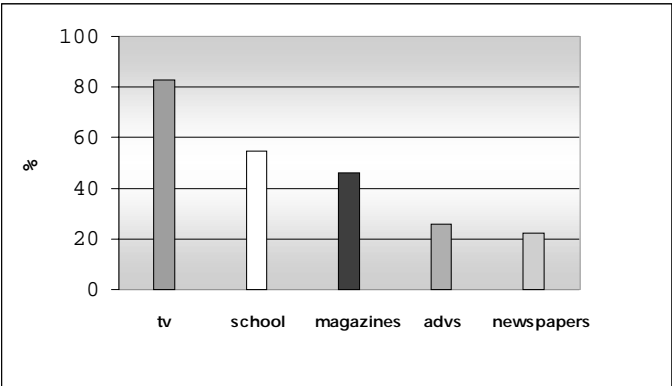


Fig.4 Sources of knowledge about diet

Students' beliefs about the role of school in their dietary habits

8) To the question *do you think that diet matters should be part of your education at school* 64% answered yes.

9) In the next question *does school contribute to the shaping of children's dietary habits* 68.9% said that the "family" is the major contributing factor, 35.8% answered "the school" and 35.1% said "the media" (figure 5).

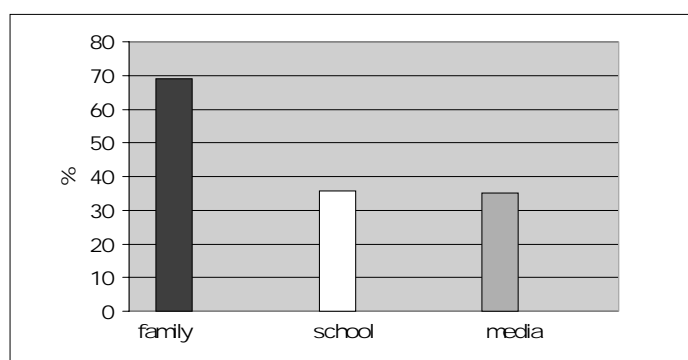


Fig.5 Factors contributing to the students' shaping of dietary habits

10) In the question *taking in account your own experience at school can you suggest ways which could help children obtain healthy dietary habits* 36.4% answered that children should have nutrition lessons at school by a specialist, 27% said that school canteen could contribute by serving healthy foods and 19.5% do not think that school could contribute at all.

#### Student's knowledge of the chemical constitution of foods

11) To the question *according to your opinion what do you believe are the most important kinds of food in human diet* 67% listed milk and its product (cheese, yoghurt, butter etc), 45% vegetables and pulses, 38% fish and 35% meat (figure 6).

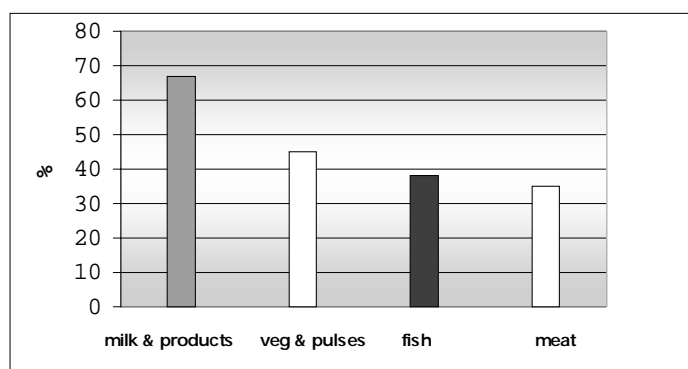


Fig.6 Most important kinds of food in students' diet

12) For the next question *in the following list which food contains proteins, fats, carbohydrates* the answers are given in table 2.

Table 2. (% of students)

#### Content of foods in protein, fat and carbohydrates as answered by the students

Food	Content of foods			
	protein	fat	carbohydrate	do not know
Fruits	57.3	0.0	30.6	1.3
Chicken	64.0	56.0	22.6	1.3
Lamb	38.6	96.9	16.0	0.0
Cheese	74.6	52.0	20.0	0.0
Eggs	73.3	25.3	17.3	5.3
Honey	57.3	2.6	28.0	6.6
Potatoes	24.0	4.0	86.6	1.3
Bread	36.0	2.6	76.0	1.3
Beverages	4.0	18.6	61.3	14.6
Olive oil	38.6	48.0	13.3	6.6
Butter	41.3	78.6	10.6	6.5
Vegetables	46.6	1.3	16.0	5.3

The answers to all above questions were not affected ( $p>0.05$ ) by the participant's sex.

## 2. Discussion

Health-related habits develop early in life. The period during junior-high school is especially important for developing these habits and also presents a window of vulnerability for initiating behaviour related to diet (STONE 1985; YOUNG and WILLIAMS 1989; JANSSON 1993). Because adolescent behaviours may be better predictors of disease after the age of 45 years than adult health behaviours, interventions with children and adolescents are important (TAYLOR 1999). Therefore, the goal of nutrition education during childhood is to promote dietary habits that achieve optimal health, growth, and development in a manner that also minimizes risk of nutrition-related disease. Children's food-acceptance patterns develop as a result of their predispositions, environmental affects, and interactions between predispositions and environment (BIRCH, 1990). Numerous studies have investigated diet (Department of Health, 1989; Health Promotion Wales, 1993; COLES and TURNER 1995) and changes in lifestyle (Health Promotion Wales 1996; 1997; 1998; TURTLE *et al.*, 1997; HASELDON *et al.*, 1999) in school age.

The social context in which food is eaten is important. Therefore, school and family interactions may influence children's food-acceptance patterns. When foods are given in a positive social environment, they are more likely to be accepted than when offered in a negative social context. However, in the long run this coercive-feeding practice may increase children's preferences for foods high in fat, sugar, and salt (BIRCH, 1990).

In the present study we assessed the knowledge about healthy diet and the dietary patterns of Greek secondary school graduates. Our results show that school graduates' (boys and girls) understanding of the dietary properties of foods is satisfactory. However, they do not have a good knowledge on the chemical constitution of the different kinds of food and choose their food primarily from its taste. These findings agree with HART *et al.*, (2002) who found taste as consistent influence in children's food classification. KEARNEY and MCELHONE (1999) found a negative perception with regard to healthy food and its taste.

YOUNG and FORS (2001) found a tendency for a higher percentage of males than females to eat a healthy breakfast and lunch. No difference was observed, however, between males and females in fruit and vegetable intake. Our results did not show any difference in the dietary pattern among males and females.

A more common source of information in influencing dietary habits was found to be the media and in particular television. It is well known that, nowadays, children learn about diet from television and advertisements. ROBINSON (2000), in a study in which 192 pupils participated, reported that after a six-month classroom curriculum aiming at reducing television, videotape and video game use, this also reduced significantly their overall food intake.

Family was found to play a very important role in shaping the dietary patterns among secondary school graduates. Likewise, HART *et al.*, (2003) found that parents represent a potentially powerful intermediary in behavior change strategies aimed at improving the lifestyle behaviors of children. PERRY *et al.*, (1998); CAMPBELL and CRAWFORD (2001) also reported that parents may act as potentially powerful education intermediaries because of their ability to impact upon children's developing food behaviors and attitudes through behaviors they model and reinforce.

Finally, our sample's point that school is an important contributing factor for the dietary patterns of students is supported by several studies which have evaluated the impact of a school-based interdisciplinary health behaviour intervention on diet among children. GORTMAKET *et al.*, (1999) reported that a two-year intervention resulted in reduction of the percentages of total energy from fat and saturated fat among students compared with controls.

SHEPHERT and DENNISON (1996), agree with this finding stating that school may play important role and override parental control when children reach secondary school period. YOUNG and WILLIAMS (1989); JANSSON (1993) found that health education in schools can be an effective means of encouraging a healthy population for the future.

## CONCLUSIONS

In conclusion our results show that secondary school graduates know, to a large extend, what are the suitable foods for a healthy diet, however they do not know the reason for which they should prefer these particular foods since in general they lack knowledge on their chemical constitution. Their main information source on dietary matters was found to be television and to a lesser extend school. Family plays the major role in shaping up their dietary habits while school has a smaller effect. Nevertheless

students believe that school could contribute more in dietary matters if suitable educational programmes were included in the curriculum.

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APPENDIX I

Questionnaire

1. How often do you consume the foods of the following list? Please tick accordingly.

Food	Every day	2-3 times a week	Once a week	Never
Bread				
Olive oil				
Seed oil				
Potatoes				
Sweets				
Snacks				
Delicatessen				
Meat				
Chicken, Eggs				
Fish				
Vegetables				
Pasta				
Pulses (dried beans, lentils, chick peas)				
Fruits				
Milk, yoghurt				
Cheese, butter				

2. Please describe everything you ate yesterday in detail:  
For breakfast:  
In between:  
For lunch:  
In the afternoon:  
In the evening:
3. What are the criteria for choosing a food. List them according to their importance:  
Controlling my weight? ☐  
If the food is healthy? ☐  
If the food is tasty? ☐  
Other? ☐
4. Do you prefer to eat:  
at home? ☐  
out? ☐
5. What healthy diet means for you?
6. Among the categories of food listed below which do you think we should prefer to eat?  
(You can choose more than one answer)  
*Category 1*  
Butter, fish fat, vegetable butter, olive oil, seed oil.

#### Category 2

White sugar, brown sugar, artificial sweetener.

#### Category 3

Pulses, boiled potatoes, pasta, white bread, brown bread.

#### Category 4

Chicken, fish, lamb meat, cow meat.

#### Category 5

Can fruit juice, fresh fruits, fresh fruit juice.

#### 7. Your knowledge about diet comes from:

(You can choose more than one answer)

School? ☐

Magazines? ☐

Newspapers? ☐

Radio? ☐

Television? ☐

Advertisements? ☐

#### 8. Do you think that diet matters should be part of your education at school?

#### 9. Does school contribute to the shaping of children's dietary habits? Apart of school what other factors may contribute?

#### 10. Taking in account your own experience at school can you suggest ways which could help children obtain healthy dietary habits?

#### 11. According to your own opinion what do you believe are the most important kinds of food in human diet?

#### 12. In the following list which of foods contain protein, fat, carbohydrates?

Fruits	Potatoes
Chicken	Bread
Lamb	Beverages
Cheese	Olive oil
Eggs	Butter
Honey	Vegetables

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## El origen de la vida como t3pico generativo en la ense1anza para la comprensi3n

### The origin of life as a generative topic in teaching for comprehension

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#### Resumen

*Este trabajo desarrolla una estrategia con docentes para abordar la selecci3n de los contenidos en temas de biolog3a a trav3s de la construcci3n de t3picos generativos. Los t3picos generativos que propone el modelo de la "ense1anza para la comprensi3n" ha sido usado como marco de referencia para esta propuesta. Se trabaj3 con docentes en dos etapas, una inicial de desempe1o exploratorio, cuyo prop3sito fue conocer qu3 conciben los docentes acerca de la comprensi3n y otra de desarrollo llevada a cabo por medio de una investigaci3n guiada. Como resultado de la implementaci3n de la estrategia, se obtuvieron por una parte, resultados con respecto al reconocimiento que hacen los docentes de la comprensi3n y los procesos que esto implica. Por otra, los docentes elaboraron una red conceptual de la que surge como idea m3s significativa y posible t3pico generativo al "origen de la vida" superando la esquematizaci3n tradicional del curr3culo en biolog3a celular, gen3tica y evoluci3n.*

**Palabras clave:** ense1anza para la comprensi3n, origen de la vida, t3pico generativo, biolog3a.

#### Abstract

*This paper develops a teaching strategy to select contents related to Biology through the construction of generative topics. Generative topics constitute the first step proposed by the model known as "Teaching for Comprehension", which is here employed as a methodological framework. The work with teachers was carried out in two steps: an initial step of exploratory performance, with the purpose of identifying what teachers understood about comprehension; and a second step, which was a research carried out by the teachers under supervision. The strategy was implemented and results were obtained regarding the level of teachers' knowledge about comprehension and the processes involved. Furthermore, the teachers formulated a conceptual network, from which "The Origin of Life" was identified as the most significant idea, and as a possible generative topic. This finding goes beyond the classical schematic curriculum used in Cellular Biology, Genetics, and Evolution.*

**Key words:** biology, generative topic, origin of life, teaching for comprehension.

#### INTRODUCCI3N

En el marco moderno de la educaci3n existe la idea que las personas poseen inteligencias m3ltiples, m3s o menos aut3nomas (WALTERS y GARDNER, 1985, GARDNER, 1987, 1997). GARDNER (1993) define la inteligencia como "la capacidad de resolver problemas o productos

habituales" distinguiendo un perfil de inteligencias espec3ficas que cada persona usa para resolver problemas. Estas ideas est3n fuertemente vinculadas con la capacidad de comprensi3n opuesta a la memorizaci3n. Aplicar un intento para resolver el persistente problema de c3mo los alumnos comprenden y utilizan los conocimientos es la propuesta de la "Ense1anza para la comprensi3n" (EpC) llevada a cabo por GARDNER, PERKINS y PERRONE en la escuela de graduados de la Universidad de Harvard (STONE WISKE, 1999; GARDNER, KORNHABER y WAKE, 2000).

Una dificultad inicial para comenzar a trabajar con la EpC es la selecci3n de los contenidos que promuevan efectivamente el inter3s de los estudiantes y se estructuren de una determinada forma para posibilitar su comprensi3n. Evidentemente no todos los contenidos pueden proporcionar la oportunidad al docente de concretar una ense1anza comprensiva. En la realidad educativa, los curr3culos escolares predeterminan los temas a ense1ar, entonces se plantea el problema de c3mo transformar estos contenidos.

Por otra parte, el marco conceptual de la EpC presenta cuatro ideas fundamentales: los t3picos generativos, las metas de comprensi3n, los desempe1os de comprensi3n y la evaluaci3n diagn3stica no son planteados a modo de normas y con una secuencia fija —se trata de un marco de trabajo que permite el dise1o y la organizaci3n de los elementos de un programa—, como tampoco hay una 3nica manera de implementar el enfoque (BLYTHE *et. al.*, 1998).

Desde este enfoque la pregunta central que nos formulamos en este trabajo se refiere a 3cu3les son los temas, cuestiones, conceptos, ideas para apoyar el desarrollo de comprensiones profundas por parte del alumno?

A partir de este problema se genera la presente propuesta, cuyo objetivo central es desarrollar una estrategia con docentes para explorar sus ideas sobre la comprensi3n, con base en un n3cleo de conceptos centrales en la ense1anza de la biolog3a moderna, como son la "biolog3a celular, gen3tica y evoluci3n". Se propone como objetivos espec3ficos, reflexionar sobre el inter3s e importancia de estos temas para el dominio de la biolog3a y elaborar una red de conceptos que permitan dise1ar t3picos generativos que faciliten la motivaci3n de los alumnos y favorezcan su comprensi3n.

Para poder abordar estas cuestiones consideramos importante incluir en esta propuesta una breve rese1a sobre la EpC, para luego desarrollar en las siguientes secciones la estrategia usada con los docentes para concretar los objetivos de este trabajo y su evaluaci3n.