Social and Natural Sciences in Nutrition: studying the opinion of undergraduates from Brazil and Spain

Ciências sociais e Ciências Naturais na formação em Nutrição: discutindo a opinião de estudantes no Brasil e na Espanha

Ciencias Sociales y Ciencias Naturales en el grado en Nutrición: Discusión de la opinión de los estudiantes en Brasil y España

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ABSTRACT

Introduction. Our interest in this study is to consider differences in the nutrition degrees of Brazil and Spain. It forms part of a comparative study, with the principal objective of discussing the role of social sciences throughout the nutrition courses of these two countries. The question analyzed considers the perceived relative importance given to different subjects by nutritionists throughout their degree. **Methods**. This was mixed methods, cross-sectional study. Questionnaires were completed by 820 students from 17 universities in Rio de Janeiro (Brazil) and Catalonia (Spain) while in both countries focus groups and interviews were performed with students from representing each year of the course. The questionnaire results were analyzed quantitatively using the Likert scale, with the responses divided according to weighted relative frequencies. **Results.** The Brazilian students a greater perceived importance of chemistry throughout their degree ($p<0.05$) while the Spanish students, emphasized the importance of social studies such as sociology and psychology ($p<0.05$) over the scientific topics of chemistry and statistics. **Conclusion.** These results provide an apparent paradox given the greater socio-economic inequalities in the Brazilian context, where social studies could be helpful to confront food and nutritional issues. The results of this study open possibilities for greater contextualization in approaches to the Natural Sciences, including dialogue with social and cultural issues, and the possibility of broadening the focus of teaching on the human body to articulate social, economic and politic aspects.

Keywords: Education; Nutrition; Higher Education Policy

RESUMO

Introdução. Nosso interesse neste estudo está em considerar as diferenças nos cursos de Nutrição do Brasil e da Espanha. Ele faz parte de um estudo comparativo, com o objetivo principal de discutir o papel das ciências sociais na formação em Nutrição nestes dois países. A questão analisada considera a importância relativa dada pelos estudantes de nutrição durante toda a sua graduação. **Métodos**. Foram utilizados métodos quantitativos e qualitativos. Foram aplicados questionários entre 820 estudantes de 17 universidades no Rio de Janeiro (Brasil) e na Catalunha (Espanha), enquanto grupos focais e entrevistas foram realizadas em ambos os países envolvendo alunos de cada ano do curso realizado. Os resultados do questionário foram analisados utilizando a escala de Likert, com as respostas divididos de acordo com as frequências relativas ponderadas. **Resultados**. Os estudantes brasileiros consideraram mais importante a disciplina de química ao longo de sua formação ($p < 0,05$), enquanto os estudantes de espanhol, enfatizaram a importância das disciplinas sociais, como sociologia e psicologia ($p < 0,05$) em oposição à química e a estatística. **Conclusão**. Estes resultados fornecem um aparente paradoxo, pois diante das maiores desigualdades socioeconômicas existentes no contexto brasileiro, as questões sociais poderiam ter maior pertinência para o exercício profissional das futuras nutricionistas. Os resultados deste estudo abrem possibilidades para uma maior contextualização nas abordagens dadas às ciências naturais, incluindo o necessário diálogo com questões relacionadas à sociedade e à cultura, bem como a possibilidade de ampliar o foco do ensino sobre o corpo humano ao articular aspectos sociais, econômicos e políticos.

Palavras-chave: Educação; Nutrição; Políticas de Educação Superior

RESUMEN

Introducción. Nuestro interés en este estudio es examinar las diferencias en los cursos de nutrición en Brasil y España. Es parte de un estudio comparativo con el principal objetivo de discutir el papel de las ciencias sociales en la formación en Nutrición en estos dos países. La cuestión es considerada por la importancia dada por los estudiantes en los años de formación. **Métodos**. Se utilizaron métodos cuantitativos y cualitativos. Los cuestionarios se administraron entre 820 estudiantes de 17 universidades en Río de Janeiro (Brasil) y Cataluña (España), mientras que los grupos focales y las entrevistas se llevaron a cabo en ambos países e involucran a los estudiantes en cada año del curso realizado. Los resultados del cuestionario se analizaron usando la escala de Likert, con las respuestas ponderadas de acuerdo con las frecuencias relativas. **Resultados**. estudiantes brasileños dan más importancia a la química a través de su entrenamiento ($p < 0,05$), mientras que los estudiantes españoles, hizo hincapié en la importancia de las disciplinas sociales como la sociología y la psicología ($p < 0,05$) en comparación con química y estadística. **Conclusión**. Estos resultados proporcionan una aparente paradoja, porque en las mayores desigualdades socioeconómicas existentes en el contexto brasileño, asuntos sociales podrían ser más útiles para la práctica profesional de los

futuros especialistas en nutrición. Los resultados de este estudio abren posibilidades para una mayor contextualización en los enfoques dados a las ciencias naturales, incluyendo el necesario diálogo sobre temas relacionados con la sociedad y la cultura, así como la posibilidad de ampliar el enfoque de la enseñanza en el cuerpo humano para articular cuestiones sociales, económicas y políticas.
Palabras-llave: Educación; Nutrición; Políticas de Educación Superior

As for butter versus margarine, I trust cows more than chemists.
Joan Gussow

The structure of the nutrition degree course is strongly influenced by the Natural Sciences. Chemistry was first applied in the study of food composition and nutrition at the beginning of the 19th century, the period in which the French doctor and chemist Nicolas Clement applied the term calories. At the end of the same century, the American chemist Wilbur Olin Atwater developed the techniques for measuring carbohydrates, proteins and fats in numerical values still used today (1). From this point on, the natural and "scientific" aspects of food and consumption have gained importance, leaving aside their social and symbolic value.

Nutrition and dietetics is a recent area in science, and as a profession originates in the 20th century. Nutritionists are gaining space and importance with increasing demand in health promotion and disease treatment, especially eating disorders. The question is how do nutritionists perceive the importance of different subjects throughout their degree? What is their perception of the importance of social, formal and natural sciences for their professional future?

Our interest in this study is to consider differences in the nutrition degrees of Brazil and Spain. It forms part of a comparative study, with the principal objective of discussing the role of social sciences throughout the nutrition courses of these two countries. The foci chosen were: in Brazil, Rio de Janeiro, a state capital with approximately 7 million inhabitants; and in Spain, the Autonomous Community of Catalonia, with a population of 6 million, whose regional capital is Barcelona.

Methodology

This study forms part of the project Food, culture and society: a study on the presence and contributions of sociology and anthropology in the nutrition courses of the municipalities of Rio de Janeiro and Catalonia. The project was developed by the Center for Educational Technology for Health (NUTES), Federal University of Rio de Janeiro (UFRJ) in partnership with the Nutrition Institutes of UFRJ and the State University of Rio de Janeiro (UERJ) and Barcelona University's Observatorio de la Alimentació. It was a cross-sectional study divided in two phases. It received funding from the Research Foundation of the State of Rio de Janeiro (FAPERJ) and the Agencia Española de Cooperación Internacional para el Desarrollo (MAEC-AECID), and was approved by the research ethics committee of the Institute for Studies in Public Health (UFRJ). Confidentiality and anonymity were guaranteed in the two countries and participants signed an informed consent form. The study was conducted by a team of researchers trained and educated in the fields of Nutrition and Social Sciences.

In the first phase a quantitative method was used to describe the studied phenomena in such a way that it magnified different aspects of the gap between the biological and social subjects in the dietitians training in both countries. A second qualitative phase was undertaken to complement these findings and better understand the identified phenomena. The qualitative research applied multiple techniques including participant observation, interviews and focus groups. The last were performed in both countries.

Data collection, quantitative phase

In Brazil, data was collected between January and June 2008 and in Spain between November 2008 and February 2009. Data collection in Brazil was performed by a team of trained interviewers supervised by the research coordinators and in Spain by the coordinators themselves, the authors of this article.

The study questionnaire was constructed in five stages. Initial work focused on defining the concepts behind the instrument and its structure using the following questions: Does the training nutritionists receive empower them to confront social

inequalities linked to the health scene in Brazil and Spain? What place should the social sciences, especially sociology and anthropology, have in the preparation of undergraduate nutrition students?

Considering these issues a literature review was initiated on the following topics: health training, particularly nutrition; the history of the creation of nutrition courses in Brazil and Spain; higher education and the youths' motivation in starting a college course; student's reality and eating habits; and the employability of nutritionists in Brazil and Spain. Various validated questionnaires from previous studies with the same population were also consulted. Field research was conducted with the participants of conferences and events related to these themes in Brazil and Spain as well as exploratory interviews with teachers and researchers involved in nutritional education in both countries.

With these data, a first draft questionnaire was developed with the following sections: family information, personal data, academic life, course information and professional expectations, cultural information and information on food. In the final stage, the instrument underwent pre-testing with students from different phases of the nutrition course and in different cultural contexts (Rio de Janeiro in April 2008 and Catalonia in December 2008). The completion time for the questionnaire averaged forty minutes in both languages, and it was well accepted by respondents.

The questionnaire developed and validated in Portuguese was translated and underwent a process of cultural adaptation for the Catalan context. In depth interviews were conducted with appropriate individuals at Catalonia University to identify the appropriate language and socio-cultural adaptations for this location. The procedures adopted by the team demonstrated the instrument's effectiveness and quality resulting in a set of questions that are easily comprehended and that cover the issues outlined in the first stage of the research.

After completed questionnaires were reviewed by a supervisor, they were coded and entered into a database. These procedures were adopted throughout the research process in order to ensure the reliability of the results.

Qualitative phase

Qualitative data were collected by the researchers as conducting focus groups and implementation of the other techniques used to supplement the analysis requires greater technical skill. The focus groups in Rio de Janeiro lasted on average one hour due to logistical issues and because of geographical and social diversity it was decided to hold five focus groups. In Spain, only one focus group was conducted due to logistical constraints. It was not possible to conduct two as originally planned. This single focus group was deemed sufficient to obtain a data set adequate for the clarification and understanding of the survey results.

The focus groups were facilitated by one of the research coordinators using a question guide. The groups were recorded digitally for subsequent transcription and analysis.

Data Analysis

Statistical analysis was performed on the exploratory quantitative data [2]. The association between variables was estimated using the chi-square test ($p < 0.05$). Qualitative data was analyzed using thematic analysis as a reference [3].

Results

Students' perceptions on the importance of the subjects

In this article we will discuss data from self-reported questionnaires used with 489 participants in Rio de Janeiro and 331 in Catalonia. The study aimed to use the questionnaire with students at all the universities in both regions. In Rio de Janeiro it was used in twelve higher education institutions and five in Catalonia. This included all the universities that offered an undergraduate nutrition course with at least one class graduated at the time of the study.

In total there were 820 respondents, representing the initial classes and those graduating from the nutrition course in both countries in 2008 and 2009. The questions analyzed for this article relate to the students' opinion of the importance of a group of subjects to their profession. The results from the quantitative research

showed differences in opinion of importance of social and natural sciences between students from the two regions. A particularly accentuated difference was found in the importance attributed to chemistry in these two contexts.

In the question analyzed, eight subjects were presented to the students and they selected an answer according to its importance to their profession from a Likert importance scale: “very important”; “important”; “less important”; “not important”; “indifferent”. Answers were almost unanimous among the undergraduates in Rio de Janeiro and Catalonia about anatomy, it was considered very important. Biology and psychology were considered important, communication and genetics were positioned as mediocre, and statistics was said to be one of the less important in both regions. However, in Spain as much as in Brazil, two subjects stood out: chemistry and sociology. Table 1 contains the frequencies of those who responded very important or important to each subject in the question.

Table 1 – Percentage of nutrition undergraduates that consider the following subjects very important and important in their future profession. Catalonia-Spain (2009); Rio de Janeiro-Brazil (2008) (%).

Subjects	Rio de Janeiro	Catalonia
Anatomy	96.5	97.3
Chemistry	92.5	62.3
Biology	91.6	89.4
Psychology	82.0	89.5
Communication	77.4	87.0
Genetics	78.8	72.4
Statistics	61.0	40.1
Sociology	60.1	74.8

In both countries statistics received little importance compared to other subjects, yet among Catalan students this was more evident. Results demonstrate a higher number of undergraduates that reported the subject “less important” or “not important”, than those who indicated a positive importance. There is not an easy

explanation to this finding, it could be attributed to the way the subject is taught in Spanish Universities or to specific situations in the studied region.

Throughout the field research we observed recurrent comments on the fragility of the degree in Spain, considering that up to 2009 it consisted of a “diplomatura”, a course with three years duration. Some teachers indicated that this duration was insufficient and therefore students concluded their degree with a series of deficiencies. Statistics, as well as trainee placements, were considered especially affected by the lack of time, contributing to the inability of students and graduates to perform in these areas of knowledge.

In Brazil’s case, the greater value attributed to statistics drew our attention though our observations in Rio de Janeiro may not be nationally representative. Possible explanations for these differences do not fit the history of the course in Brazil and Spain. The Brazilian nutrition degree had its birthplace in sociology and medicine, through Josué de Castro, a medical doctor and author of the book *Geografia da Fome* [*Geography of Hunger*] (1946), and a group of friends, due to the need to deal with social problems related to economic inequalities and the high prevalence of hunger and malnutrition (4). In Spain, the course’s origin was related to Jose Mataix Verdu, who had a bachelor’s degree in pharmacology and veterinary medicine. He dedicated his studies to adequate diets, nutritional balance, and innovative discoveries with olive oil, on which he developed his doctorate degree (5). The nurse Pilar Cervera was also important in this context, she dedicated her initial years as a professor teaching health professionals about an appropriate diet to treat diabetic patients.

In Brazil the nutrition undergraduate course, which was recognized in the 1960’s, has undergone a significant growth in terms of the number of courses and placements in recent years. Since 1979 the number of courses offered by higher education institutions has risen from seven to 493 in August 2016 (source: e-Mec). One characteristic of the course is a gap between biological and social studies in the curriculum (6). The degree in nutrition is positioned in the health field and includes in its basic structure subjects related to chemistry (analytic, organic and experimental).

In Spain, nutrition was only officially recognized as an undergraduate course in 1998. Besides being a recent profession, the course offered until 2009 was a *diplomatura* which is by nature a more technical and vocational course with the intention of rapid insertion into the labour market. As such the course had a duration of only three years, one less than in Brazil. From 2009, as per decree CIN/730/2009 of the Ministry of Science and Innovation of 18 March 2009, the course came to be offered as *grado* (graduate course), with four years duration and seeking equivalence in hours of study in accordance with the Spanish implementation of the Qualifications Frameworks in the European Higher Education Area (QF-EHEA) which sought to align higher education across Europe (Bologna Process) [7]. This study is particularly interesting in that it considers the exact moment that one type of course was discontinued and another initiated. As such, due to its strong association with the applied sciences and because of its recent development requires participation of professionals from other areas, such as pharmacy, nursing and medicine. Its main efforts are to assure space and professional recognition [8].

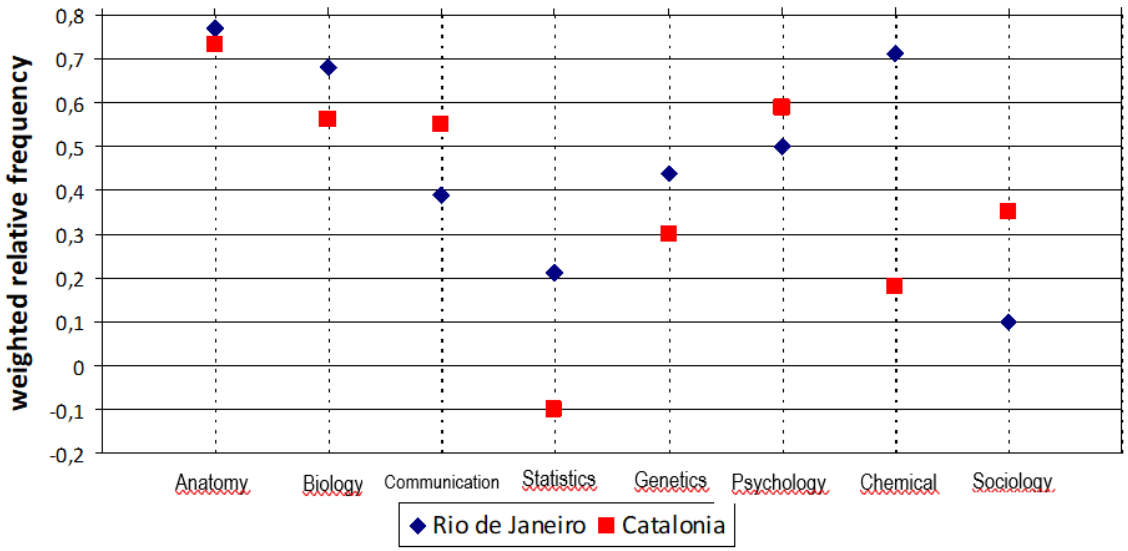
Comparison of the curriculum change between the two Spanish courses, from the *diplomatura* (193 credits) to the *grado* (240 credits) confirm the issues identified throughout this study. As the University of Barcelona (UB), the increase in hours of study resulted in an increase in chemistry lessons (18 credits to 24), of biology (21 credits to 30) and inclusion psychology in the titles and content of modules in anthropology and of food and nutritional education having been absent from disciplines of courses offered prior to 2009. Nutrition courses at the UB also came to include genetics, biostatistics and applied mathematics.

Graph 1 presents a visual display of the results from the question in which the students had to indicate the importance of eight subjects to their future profession, it was elaborated based on scores given to their answers according to the Likert scale (very important= 1; important= 0.5; indifferent= 0; less important= -0.5; not important= -1). Thus, the final score represents a weighted relative frequency and can range between 1 (when all the respondents consider the element as very important) and -1 (when no one considers the element important) [2]. Results close to zero indicate a

neutral response from the sample, when approximately the same amount of people responds positive and negatively to the question.

In Rio de Janeiro, the great majority of the nutrition undergraduates considered chemistry to be very important or important; a total of 92.5%, whilst in Catalonia this percentage was 62.3% (Table 1). Graph 1 illustrates the significant difference in the perception of chemistry to the two groups. This difference was also evident in the high percentage of Catalan students that reported chemistry less important and not important, a total of 34%, whereas in Rio de Janeiro only 7.1% gave the same response.

Graph 1 - Importance attributed by the nutrition undergraduates to a group of subjects in their future profession - Weighted relative frequency. Catalonia-Spain (2009); Rio de Janeiro-Brazil (2008).



Source: *Food, Culture and Society Research*

The percentage who attributed importance to sociology was likewise different in each context. For the Brazilian students sociology is the least important among the eight subjects presented. This place was occupied by statistics in the Catalans' opinions, as for sociology they positioned it fourth, ahead of genetics, chemistry and statistics. The percentage of answers given as "less important" and "not important" to

sociology by the undergraduates from Rio de Janeiro was 48.3%, and 30.2% by students from Catalonia.

The opinion of the students was associated to their home country with statistical significance ($p<0.05$) for all the subjects. Chemistry was given a privileged position, second place, among the respondents from Rio de Janeiro. This opinion was confirmed by the focus groups that were carried out later on in the city. In general, the undergraduates from Catalonia seem to value social studies more, assuring greater importance to sociology, which was in second position, as well as to communication and psychology. This greater value can be justified by the Spanish course's intention, which was established with social discussions as cross-cutting themes, and as its origin foresaw subjects linked to the socio-anthropology and history of eating habits. Conversely, in Brazil social studies are not considered as cross-cutting themes while greater value is given to biomedical and technological aspects in teaching and research [9]. The inclusion of subjects related to social studies has only drawn attention in the past five years.

Analysis of the focus groups aid in understanding this issue. In several moments the Rio students showed an appreciation for chemistry. It seems that the selection process for the nutrition course requires a greater knowledge of chemistry from high school in order to receive a better position in university entry exam results. The private universities appear to value chemistry less than public ones, which may be due to lower competition in their entry exams. In private universities the reason for appreciating chemistry was linked to experiences with the subject during the actual course:

> I think that with the entry exams as they are….we have to choose a career based on what you like, and the profession also…for example, I never liked maths, so I would never do an engineering course…But I've always liked chemistry, you know, so I think I came here [referring to the university], already liking chemistry, so, and I think that nutrition has a lot of chemistry. Food is also chemistry. I see chemistry in the way that everything is interconnected. Chemistry shows the composition of everything, right, of our body in general, so it will show the composition of the foods and we have to know the composition of these foods to know how they will interact in our organism...(A3FG5)

> I liked chemistry a lot, because I was taught analytic experimental chemistry… when taught in the first period, and biochemistry in the second, I think we have a better basis, I like biochemistry so much, I work with biochemistry, my laboratory is in biochemistry, so… this influenced a lot. (A1FG3)

> …My chemistry was poor back in high school. Here [referring to the university] it wasn't so bad. But, we are learning chemistry now, biochemistry and there are a lot of things there that…and I'm…[hands up in the air, representing someone floating]…And we had organic chemistry as an optional subject and you can only do biochemistry after you have done chemistry. And that is kind of strange. Now I have a basis, I have something, but you have to remember what you…I learnt it ages ago and had to pick up biochemistry. Wow! (A5FG 3)

> I think that its important because food has a chemical structure and it reacts with others... there are so many different foods you learn in nutrition… chemistry has a lot to do with nutrition, yes. But one of the points I learnt when... and we said: "So what led you to do nutrition" and I said: "Oh, well, I like chemistry." (A1FG4)

> Everything is interconnected. So I think that because of that, I don't know...but I already came here [referring to the University] liking it a lot. I chose this here, because I knew that it involved a lot of chemistry, it helped me, it was a point that helped me, you know. (A3FG5)

The importance given to chemistry can also be explained by the teachers' understanding of it and the manner in which it is values by them as being central to training in nutrition. Their opinion of the subject's importance is linked to the knowledge of the chemistry of food and nutritional composition, and other related subjects such as biochemistry and those specific to nutrition. Even though the students from Rio de Janeiro claimed to have little experience and, even, little previous knowledge in chemistry, they repeated this explanation several times reaffirming the importance of the subject:

> Well, we started the second period and we're learning biochemistry and "you're going to need biochemistry for the rest of your degree" [referring to the teachers]. "Oh, well". Then they keep on saying "guys, this is important". If we don't learn chemistry, biochemistry is complicated. We need chemistry and we're only going to learn it later on. And biochemistry is for you to talk a bit about food, understand food. (A6FG2)

> I think it's very important...but I found it hard. The teacher puts a carbon molecule and says that each one of them is this, is that [referring to the importance given by the teacher]. In my opinion it's a fault. Mine? I don't know. Could I have learnt it before? Yes, I could. But the University also has this difficulty that they could do this to make peoples' lives easier. We also have this deficiency of knowing what's what.... that this is glucose and that is cholesterol. (A4FG3)

> I didn't arrive here liking Chemistry. But there was this exam I did, it was a final exam, so not everyone took it. The teacher wrote at the end of the exam: "what do you think that this subject…", she wrote it as a question of the exam, "…will add to you in nutrition? To understand nutrition?". Then in the middle of the exam, I stopped to think. I don't like Chemistry and I'm here doing a final exam, and she asks me this….[laughter]. I was annoyed. And after, when I talked to her, she said: "Have you thought that when you prescribe a medication for anemia, that you will need to know the amount of iron, you know, then I looked at her and: oh yeah, I hated Chemistry, I was held up in the final exam, but then, I stopped to think. Something that was obvious but I hadn't thought about before…maybe a medication, maybe to analyze the amount of iron for anemia, and so on… it was interesting. (A2FG1)

Chemistry occupies a central position in Brazilian health education that is expressed in the curriculum, reaffirmed by the teachers and accepted by the students. The nutrition courses in Rio de Janeiro, following the same pattern in São Paulo [10], have between 500 and 600 hours of subjects related to chemistry. This can include up to six subjects offered during four semesters at the most, such as biochemistry, analytic, organic and inorganic chemistry. Conversely, in Catalonia the chemistry related subjects do not exceed 450 hours of the nutrition curriculum until 2009. This was cited by one Catalan undergraduate as a reason for the low importance attributed to the subject in Spain:

> In the nutrition and dietetics degree in Spain only one subject related to chemistry is taught (in the first year). Besides, I think that it's focused on a theoretical point of view and, therefore, many times, the students, we don't relate the knowledge we gain in this subject to the practical side and don't use it. (A2FG6)

The relationship between basic knowledge and practical use is also indicated as a reason for the low importance of the subject. This issue is present in proposals to rethink biochemistry education in degrees from the health area [10] and is one of the

central points of discussion for restructuring the curriculum of the medicine courses in Brazil, for example. The data we analyzed indicate that in Brazil the teachers responsible for chemistry related subjects obtained better results when showing the links between chemistry and nutrition. It seems that this issue is not only present in the approach to teaching, but particularly in the characteristics of the current nutrition degree in Brazil.

In the Brazilian degree a significant value is attributed to biomedical aspects, usually associated to quantitative methodologies and investigative processes in which the calculation of nutrients is central. One of the ideas identified through the focus groups is that the importance of chemistry can be justified by the perception that life is part of a great chemical system, in which the human body, as well as food and the physiological processes of digestion and food absorption, can be explained mainly by Chemistry:

> Foods are several chemical components (...) everything in nutrition has to have chemistry. It's essential! Chemistry will make everything work! Nowadays, we know through studies done by the university that there is an interaction between one type of food and another, so, maybe.... if you combine one thing with another, this involves chemistry. An interaction of one chemical element that another food has might stop the absorption of what you want. (A6FG1)

> ...it's nothing more than entangled links – we are – entangled links between chemical elements. (A1FG2)

> ...chemistry is important for this reason, because everything that happens inside the human organism is through chemical reactions, through interactions between molecules to create a systemic response and create a person, and transforms into us here. (A3FG5)

Therefore, the Brazilian students show in their speeches the relationship between chemistry and their understanding of food, dissociated from human contexts and relations. They perceive that the knowledge of chemistry will provide the greatest analytical ability. An analysis that is calculated quantitatively, each nutrient and component of the food items will be considered precisely. The knowledge necessary to calculate metric values and exact quantities of each nutrient is valued as something that can define the performance of a good professional.

> ...it's chemistry because of food. [We are] concerned with the exact quantities of what will be ingested, how much carbohydrate, how much fat, how much protein, so, I think that we understand that a lot more, like, that everything has to be right, calculated. (A2FG1)

The concern that everything is "right, calculated" seems to be less present in Catalonia, where the course has time limits (only three years) and chemistry occupies the same time as the subjects related to social studies. Whilst in Brazil at least twice the number of lessons are dedicated to chemistry as in Spain, when considering sociology and anthropology the number is similar. It is even higher in Catalonia compared to some Brazilian universities. It might be this structural difference that leads one Catalan undergraduate to say the following:

> I believe that our degree structure or even the education we have been receiving emphasizes themes related to eating habits and culture. My personal opinion is that when dealing with changes in eating habits, and in general, sociology can produce better results than chemistry in clinical practice. (A1FG6)

It is hard to imagine a speech like this coming from a Brazilian student. The greater importance attributed to chemistry seems so deep-rooted and certain that there's no space for doubts. The hierarchy of different knowledge has marked the teaching and learning processes for years, establishing a superiority of the so-called *hard sciences* (11). The issue that we consider relevant is not to deny the importance of both subjects in the nutrition and dietetics degree, but to think about how chemistry and sociology can receive equally praised positions, overcoming the archaic division between *two cultures* as predicted by Lord Snow in the Conference of 1959.

Conclusion

How can the different realities of the nutrition and dietetics course in Spain and Brazil and the opinion of the undergraduates contribute to the discussion on social and natural sciences and health degrees today? In Spain this discussion appears to involve a review of curriculums and a greater concern in establishing a better integrated education structure. Innovative teaching strategies can also contribute to

the students' better perception of the importance of areas like chemistry and the different roles it can fulfill.

Natural sciences need to consider the pedagogical possibilities beyond chemical reactions or even processes strongly linked to memorization. This may be through experiences that dedicate efforts to contextualizing the subject [12], as well as approaches that outdo biological and chemical issues and can highlight, for example, social, historical, economic and cultural aspects of the body, food and eating habits [13].

On the other hand, in Brazil, where social inequalities are still marked, the better comprehension and appropriation of social studies could provide a significant support to these professionals and natural sciences can take part in this process. An interesting example of how this can be achieved was proposed by Benore-Parsons [14] with the preparation of the future teachers in the biochemistry degree, by offering a subject called "cultural diversity". The argument for including this discussion is extensive, involving aspects related to citizenship and practical issues such as improving communication skills and attempting to better work with people from different social realities or in interdisciplinary contexts. Finally, the authors also relate that a higher education directed at social issues can likewise be useful in the application for research funding, since several of the funding institutions include, for example, aspects related to gender and race in their proposals.

In both cases it is important to reinforce that science is immersed in society and therefore cannot be developed without close consideration of its social and cultural implications, whether in professional practice or education. Approaches that include the discussion of contemporary and relevant themes and a vision that takes into consideration these cultural differences and interdisciplinary context, represents a promising way to apply social and natural sciences in the nutrition area, whether in Brazil, Spain or any other country.

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