LEVELS OF PERFORMANCE IN FOOD SCIENCE AND TECHNOLOGY BACHELOR FRESHMEN DEPENDING ON PREVIOUS SECONDARY STUDIES AND OPTION CHOSEN IN SELECTIVITY

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Abstract

We studied the performances of freshmen students of Food science and technology grade the first year which this curriculum was introduced in our university. We evaluated the global results and we compared those obtained by students from High school (HSS) with those from High level training (CS). The average scores were higher for HSS than but not as remarkable as it is usually thought among teachers and for some subjects CS were even better than HSS. The fact that HSS had studied or not some subjects during high school did an enormous difference in marks obtained in them at college. So, the importance of propedeutical1 subjects before entering at the university is corroborated. The more close linking between curricula of high school related to college field envisaged by the student, the more good results will be obtained and therefore more satisfaction.

Keywords: Freshmen year, Food science and technology grade, Performances, High school, High level training.

1 INTRODUCTION

The pre-grade studies of Food Science and Technology (FST) are still little known in Spain due to its recent introduction, fifteen academic years ago, and only offered as a 2nd cycle. With the implementation of the European Higher Education Area (EHEA), such studies have become a grade of 4 courses, which start after passing the baccalaureate in a High school (HSS) or achieving a high-level training, usually named “Cycle students” (CS). Due to a general misinformation about FST studies and further professional activities (among teenagers, parents and high school teachers), there are few students who choose these studies as the first option in selectivity, but lastly the offer is completed with re-assignments which lead to a very heterogeneous group of students in classrooms.

Baccalaureate in Spain has three options: Science and technology (with one subsection more oriented to Health sciences), Social and humanistic and Arts. To gain admittance to FST grade, students have to choose Science and technology option. Regarding CS, there are a lot of options in Spain, but people who want to study FST grade usually follow training in Food industries, Laboratory analytical methods or Catering and collectivities.

In a general sense, not only for Food science grade but for all scientific and technological grades, university’s teachers think that students coming from a High school will be better students than those coming from ant High level training. Nevertheless, this is a too generic assessment because to analyze performances of both types of students many factors have to be considered and discussed. Generally, CS are older than HSS and social origins use to be different which force CS have to combine studies with work. Hoffman and Lowitzki [1] discuss the impact of High school grades and social minorities in freshmen year.

The aim of this study was to know the performances of freshmen students belonging to the first year of a new university grade in Spain, both globally and depending on their former education.

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1 Propedeutical is a foundation course for first-year university students

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2 METHODS

General data of 63 students were collected. Their marks of the ten courses followed during freshmen year were obtained from the University database. In Spain, exam and any other test are marked between 0 for the null response and 10 for the perfect one. To pass the course a minimum of 5 is required and the following segmentation is considered: between 5 and 6.9 “just” (close to C); between 7 and 8.9 “good” (close to B); more than 9 “excellent” (close to A). The analysis of available data has been carried out using the spreadsheet Microsoft Office Excel 2007. We made histograms of the marks obtained by students during freshmen year for the ten courses, as well as some charts showing a comparison of these results. We also make some charts to show a comparison in the results obtained by students from High school with those from High level training (CS), and finally compare the means of the marks obtained by students in Mathematics, Physics and Statistic, according to if they studied or not Mathematics, Physics and Mathematics (or Mathematics for the Social Sciences), respectively, during high school.

3 RESULTS AND DISCUSSION

It is well known that adolescents entering to the University suffer a culture shock and difficulties associated to the gap between study and procedures followed during High school and the new organization and requirements they found in College [2]. In our case, the naivety of students joined the enthusiasm but also the doubts of veteran professors because they were used to work with freshmen students but they faced a new grade, then none previously proved curriculum.

3.1 Global results

In Fig. 1 we show the results obtained for the ten courses followed by students, 5 in each semester fall and spring, divided within the 10-point Spanish scale. The fall semester of FST is devoted to very basic formation (Mathematics, Statistics, Physics, Chemist I and Biology), so students perceive it as a hard period which increases their anxiety, whereas during spring semester (Chemist II, Biochemistry, Microbiology, Raw materials production and Laboratory experimental) some subjects are more connected to food systems. In view of the data, clearly the worst results have been obtained by Physics, belonging to the fall semester, although the best subjects are Biology, Statistics and Chemist I in the fall semester, and Laboratory experimental and Raw materials production in the spring one, and as a consequence overall we cannot say that there is a better semester than another.

![Fig 1. Percentages of marks for each subject. Top, from left to right: Mathematics, Physics, Statistics, Chemist I and Biology. Bottom, from left to right: Chemist II, Biochemistry, Microbiology, Raw materials productions and Laboratory experimental. In the X-axe, the first column corresponds to students who didn’t finish the course and the other ten columns percentages for marks from 0 to 10 by 1-point intervals.](image-url)
In Fig. 2 we present the global mean of 10 subjects for the group of students who attend the exams. It is an average because all subjects are between 5 and 7, except one which is slightly over 7. In Fig. 3 percentages of students who pass each subject (success), the students who failed (failure) and the students who didn’t attend the final exam (NN) are shown. Here we observe worst results than before because in Fig. 3 these percentages are with respect to the total number of students of each subject, not only with respect to the students who attend the exam, as the global means of Fig. 2. The best subject was Laboratory experimental for which almost everybody attends the exam and among the attendants, nobody failed it. In the other hand, Physics had the worst results, because of up to 35 % people didn’t attend the final exam and only 40 % passed the course. All the subjects except Physics and Chemist II had a percentage of students who didn’t attend the exam less than 10%.

Figure 2. Global mean of marks obtained by students who attended the final exam, for each of the 10 FST grade’s subject.

Figure 3. Percentages of students who passed each subject (% success), who failed (% failure) and who didn’t attend the final exam (% NN).

A more in-depth analysis of results is shown in Fig.4 where the ranking marks for those who completed the exams are shown. As expected the highest percentage was for “Just” results and a very few percentage achieved and “Excellent”, even for Laboratory experimental, whose characteristics are clearly different from the rest of the subjects. It is also worth noting that if we restrict ourselves to the students who attended the examinations, the results of the subject of Physics do not stand out from the rest (except, of course, for the Laboratory experimental).
3.2 Results depending on former studies

It is a common feeling among faculties that adolescents who have attended a High school have better knowledge and skills than those who have attended a High level training, so they will succeed in college and they will keep enrolled at the university finishing the Fall and/or the Spring semester. Regarding our results it is not a correct interpretation in a global view, but it is true for the most basic subjects (Physics, Mathematics and Chemist II). Tam and Basset [3] found better results for students coming from a very diverse high school than those from a non diverse one. In Fig. 5 we present the percentages of students who didn’t attend the final exams depending on their origin, HSS or CS and the bigger ones are for CS in all cases except for the Raw materials production, in which case the two percentages are very close.

In Fig 6. percentages of failures with respect to presented distinguishing between HSS and CS are shown. So, it is a more expanded explanation of "Failed" line of Fig. 3. Here it is clear that CS is not always the worst; in fact it seems that students from CS have good practical skills and not as good theoretical learning skills, comparing with HSS. The CS students failed significantly more in Mathematics and Biochemistry and less so in Physics. The differences in Statistics, Laboratory experimental and Chemistry II are unimportant. On the opposite side, they passed more than HSS in Microbiology, Chemistry I, Raw materials production and Biology. It is noticeable that nobody from CS failed Biology whereas a 22 % of HSS did.
Figure 6. For students who completed the exams, percentages who failed each subject depending on their former studies before entering to the university: High school or Cycle students.

We think that results explained by Figs. 5 and 6 could be related to the differences in planning teaching and learning between High schools and High level training. Besides this, the average age of both groups has to be considered, because HSS are 18 years old when entering to the university whereas CS are 20. It realizes maturity and culture differences which probably make CS to reflect on the decision not to attend an exam if they don’t feel enough prepared (Fig. 5).

Finally, only for HSS, in Fig. 7 we present the average score of three subjects (Mathematics, Statistics and Physics) depending on them were been studied in High school or not, where we only take into account the students who attend the exams. The three means were significantly higher for those who previously studied the correspondent matter (Mathematics for Mathematics, Physics for Physics, and Mathematics and/or Mathematics for the Social Sciences, for Statistics). Only for Statistics both means were greater that 5 (which corresponds to passing the exam), while for the other two subjects, only means corresponding to those students that studied the corresponding subjects in High school did. Ferrari and Parker [4] found that fall credits completed were significantly related to high school averages in Mathematics and McCammon et al. [5] concluded that algebra and critical thinking skills were the best overall predictors across several physics courses in freshmen year.

Figure 7. For students who studied in a High school (HS), marks’ means for Mathematics, Physics and Statistics depending on if they had studied corresponding matter at HS (Subject 1) or not (subject 0).

Note: As all HSS studied Chemist and Biology at the High school, the former study is not possible for these two subjects.
4 CONCLUSIONS

The global results show the importance and need of propedeutical courses mainly focused on Mathematics and Physics for both groups of students, HSS and CS.

At Universitat Autònoma de Barcelona (UAB) we are strongly interested in knowing the rate of performance of the new degrees freshmen. This type of information will guide high school students and help university teachers to improve subject contents and to increase the acquisition of skills.

By means of comparison of contents and objectives of secondary level subjects and higher education ones will improve the achievement of learning objectives. Finally, it has to be used as well to re-evaluate the weight of the subjects in high school schedule.

REFERENCES


