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IRIS, Gender, and Student Achievement at University of Genova*

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The article analyses the gender effects on student achievement at University of Genova and it is a part of the research performed by the University of Genova called "Benchmarks interfaculty students: Development of a gender perspective to find strategies to understand what leads students to success in their studies", financed by the Regional Office for Equality Gender and included in the IRIS (Indicatore di Rendimento Interfacoltà Studenti (Interfaculty Students' Performance Indicator)) study, the survey implemented by the University of Genova since the AY (academic year) 2004/2005 to monitor student achievement at university. The aim of the article is to investigate students' achievements in higher education from a gender perspective through the interfaculty indicator of student achievement of the University of Genova, called IRIS. A secondary data analysis was undertaken with a quantitative approach to study the success of first-year students of the University of Genova in the AY 2009/2010. The students' sample was census, and it was clustered into the five university schools as provided by the new academic reform. Descriptive analysis, correlations, and a regression model were undertaken to focus on gender differences. The analysis was useful to show that female students are more successful than their male fellows and to find out some guidance policies for improving students' achievements according to gender differences.

Keywords: IRIS (Indicatore di Rendimento Interfacoltà Studenti (Interfaculty Students' Performance Indicator)), students' performance, students' achievement, guidance policies, orientation

Introduction

This article deals with the relationship between gender and student achievement in higher education. In Europe, recent studies (Eurydice, 2010) showed that there are more female students than male students enrolled in university courses, and the most of graduates are female. Gender differences persist in choosing courses of study and in their outcomes. Furthermore, when outside of education and training systems, women earn less and have fewer career opportunities on average than men. Gender is, therefore, a differentiation variable of students' achievement, together with socioeconomic and cultural background. Gender stereotypes affect not only the individual but also society welfare, in terms of economic growth and social inclusion (Eurydice, 2010; OECD (Organization for Economic Cooperation and Development), 2012a). On the educational level, in Europe, several projects have been launched against gender stereotypes in the choosing of an occupation and for supporting of young through systematic guidance activities; these projects are gender sensitive, but they

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lack a national overall strategy and any specific initiatives for males (Eurydice, 2010).

University of Genova is particularly sensitive to the issue: For several years, the Department for Students together with University Guidance Committee, launched a study about the relationship between gender and students' performance, the so-called "Interfaculty indicator for students' performance: Development of a gender perspective" was used to find out strategies for understanding what leads students to success in their studies. The research was financed by the Regional Office for Gender Equality of Liguria Region (Italy) and it was included in the IRIS (Indicatore di Rendimento Interfacoltà Studenti (Interfaculty Students' Performance Indicator)) study, the survey carried out by the University of Genova, active since the AY (academic year) 2004/2005 to monitor students' performance at university. This study aims to find out points of strength and points of weak, therefore, to achieve guidance integrated policies in a gender perspective.

A quantitative research was done to study the grade and intensity of gender differences as measured by the IRIS performance indicator used in the context of the University of Genova.

The idea of IRIS belongs to professor Giuseppe Lo Nostro who was led to devise IRIS due to demands of some high schools of Genova asking the Faculty of Engineering to have information about their former students' performance. In 2005, the University of Genova Guidance Committee noticed the importance of such an indicator and stated to promote and extend the use of IRIS to all students. In 2009, the report was added with a gender analysis, conducted under a convention signed among University of Genova, the Regional Office for Equality Gender and the Province of Genova. The study has shown the best performance of girls in all faculties. The aim of this perspective is to provide guidance support in order to release students' choices by gender stereotypes.

The research questions examined in the article are the following:

(1) Are there university courses for males and others female gender?

(2) Do gender differences already exist in high school and if they do, which is the relationship between high school students' performance and university students' performance?

(3) What is the effect of gender on university students' performance?

Starting from these questions, the following research hypotheses were stated:

(1) There are different academic paths according to gender;

(2) High school students' performance affects the performance of the same students in university according to gender;

(3) Gender affects academic performance in a different way according to different university schools students belong to.

The theoretical framework, the participants involved, the method used in research, and the main results are shown in the following sections.

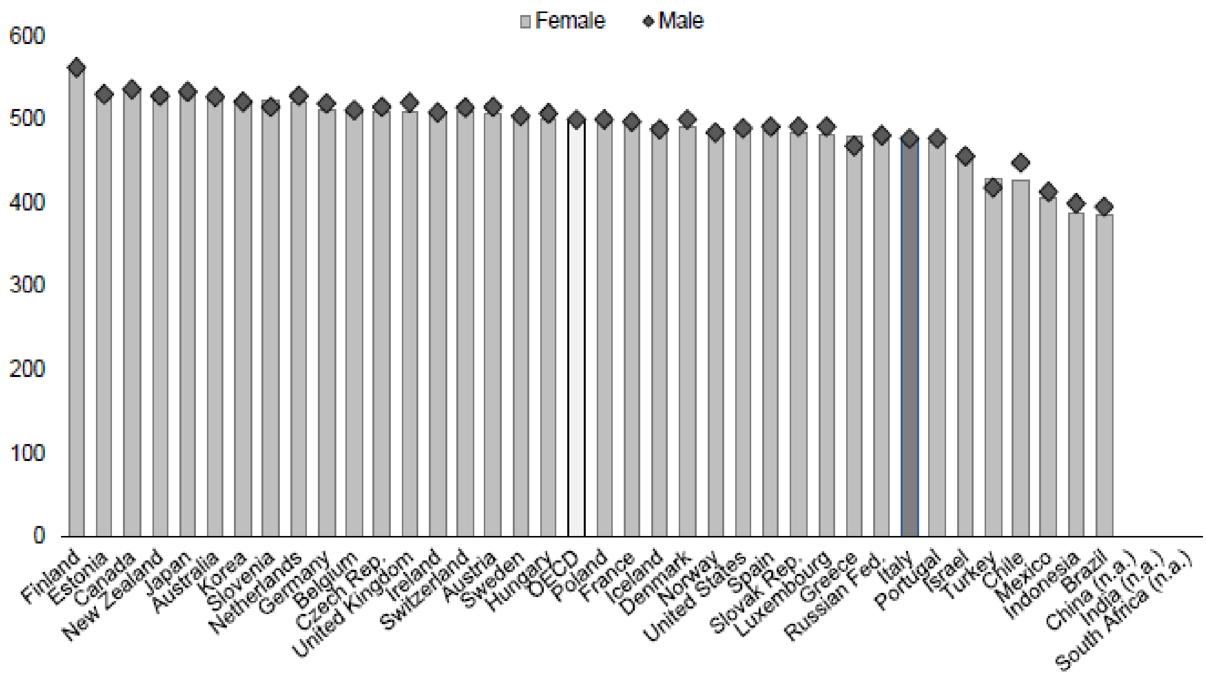
Overview

The challenge of achieving long-term growth and a strong and sustainable economic development of whole society can be met only if all available resources are better used. The leaving of women behind means not only ignore the important contributions women provide to economy, but also wasting years of investment in education of girls and young women. The taking advantage of talented people ensures that men and women have equal chances to contribute both at home and in the workplace, thereby, enhancing the well-being of both men and women, and more generally of society (OECD, 2012a).

Increased levels of education accounted for about half of economic growth in OECD countries in the past 50 years, and this had a lot to do with bringing more girls to higher levels of education and achieving greater equality between men and women about the number of years spent in education (OECD, 2012a).

In general, females perform better than males and this finding is often interpreted as a sign that gender inequalities have diminished or even reversed direction (Shavit & Blossfeld, 1993; Marks, 2008).

In many OECD countries, girls are increasingly better educated than boys, for example, at the end of compulsory education, in reading skills, on average to the equivalent of a further year schooling, and are far less likely to spend time reading only for their own pleasure (see Figure 1). Boys are ahead in mathematics but the gender gap is small compared to reading. And yet, girls are still less likely to choose scientific and technological fields of study, and even when they do, they are less likely to take up a career in these fields. Girls outperform boys in some areas of education and are less likely to drop out of school than boys. But, the glass is still half-full: Women continue to earn less than men, are less likely to make it to the top of the career ladder, and more likely to end their lives in poverty (OECD, 2012a).



Notes. PISA (International Program of Student Assessment) reading literacy is scored based on a weighted OECD average of 500, while the unweight OECD average is presented here. Data for the Netherlands in 2000 did not meet OECD standards and are therefore not presented here. Data for the United Kingdom and Luxembourg in 2000 are not comparable with later figures. Austria data in 2009 are not comparable with earlier figures (n.a. = not available).
Source: OECD PISA 2009 database (accessed June 2012).

Figure 1. Student performance in reading: PISA reading scores, by gender, 2009.

The occupational segregation literature (Charles & Grusky, 2004) points out that gender inequalities must be understood not only in terms of vertical differentiation, captured by status and income associated with particular occupations, but also with respect to the horizontal segregation, which denotes gender specific niches persisting at each level of the vertical dimension in the employment structure. Generally, there is a positive relationship between high level of academic performances and ambitious occupational goals.

Occupational expectations of 15-year-old are segregated by gender in a manner resembling gender segregation in university enrolments and in the labour market. In general, females are more ambitious than males (Buchmann & Dalton, 2002; Sikora & Saha, 2009). The results of the PISA (International Program of Student Assessment) 2006, the study by the OECD on 15-year-old students, show that girls expect more to work in higher status jobs than boys, and on average, it is 11% more likely than boys to expect to work in high-status careers, such as legislators, senior officials, managers, and professionals (OECD, 2012b).

The OECD affirms that gender segregation in the labour market is still prevalent in many countries. Science is as popular among girls as it is among boys in many countries. But a closer examination of science-related employment, discloses each gender strong preference for its own niche of science, namely, health versus engineering and computing. Women are over-represented in humanities and medical, while more men than women pursue careers in fields, such as science, technology, engineering, and mathematics science (OECD, 2012b) in line with other studies (Hill, Corbett, & Rose, 2010) which showed that women have made significant inroads into the careers in biological and agricultural sciences but continue to be dramatically underrepresented in computing and engineering. Boys and girls pursuing certain careers and making the most of their potential are still driven by factors that are not necessarily related to their actual skills. In many OECD countries, the careers girls most often expect to pursue are lawyer, authors, journalist, and other writers; those careers are not so often expected by males. PISA 2006 results showed that females perform better than males in science, but it does not necessarily means that girls want to pursue science-related careers. On average, more boys (18%) than girls (5%) expect to be working in engineering and computing. This is remarkable especially, because those occupations include also architecture, which is not particularly associated with gender. While in those countries, no OECD girl want to work in engineering and computing more than males; in OECD countries, boys want to work in engineering and computing more than girls; between top-performing students, few girls are expected to enter engineering and computing. More girls (16%) than boys (7%) plan a career in health services, a science profession with a caring component. Few girls desire employment in computing and engineering, while careers in health services do not attract many boys. Leaving science-related employment aside, socio-cultural professions appeal to girls much more than boys (Sikora & Pokropek, 2011).

Moreover, the TALIS (Teaching and Learning International Survey) done by the OECD (2009) about school teacher and teaching, showed that gender differences persist also in teaching and administrating schools: on average, 70% of lower secondary school teachers are women, or in each country, at least 50%; women are also more likely to teach language arts (79%) and human science (57%) rather than teach mathematics and science (49%); the post of school principal is largely held by men and more or less 45% are women.

In this framework, the policies for guidance in education and training can play a very strategic role in reducing gender differences. Eurydice's (2010) survey showed that in European countries, there are various policies for career guidance, which often lack a strategic vision system and a gender-sensitive approach (see Figure 2).

Italy is classified as a country that does not provide any specific career guidance actions, on the contrary, it would be important since in the overall development of the different guidance skills, the role played by gender and ethnic-cultural belongings must be taken into account. Some studies have shown how being women or men, and belonging to a different culture affects training/working individual stories and differentiates coping means in situations of transition, giving rise to needs of support that must be properly regarded and differentiated in responses when guidance actions are put in place (Guichard, 1999; Gysbers, Heppner, & Johnston, 2000).

The lack of guidance skills, both as an individual resource or as an expression of belonging to a particular social target, involves a risk of failure (or of disequilibrium) in attempting the self-government of transition experiences that people meet in their educational and working stories, and that expresses a need for professional support to the process of spontaneous self-guidance, professional support that can be answered by empirical actions (guidance actions) with different features in terms of contexts, objectives, methodologies, and tools to be activated and professional resources involved (Pombeni, 2003).

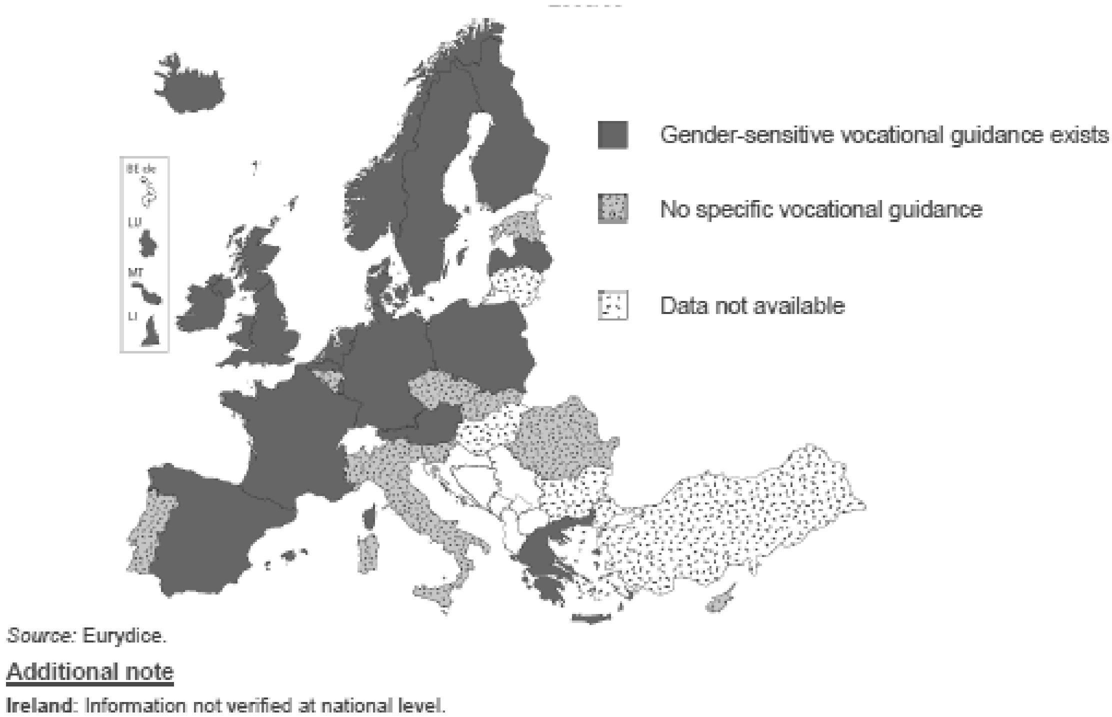


Figure 2. Specific vocational guidance to challenge traditional career choice available in Europe, 2008/2009 (Eurydice, 2010).

In Italy, girls are more ambitious than boys, but a traditional vocation of gender exists for labour market: science and technology for males and humanities and social employment for females is a statement that confirms the persistency of old value system and stereotypes (Pedrizzi, 2012).

In Italy, the INVALSI (National Institute for the Evaluation of Education and Training System) obtains students' performance through a yearly census survey in the second and the fifth classes of primary school, in the first classes of middle school, and in the second classes of high school, thanks to the test of SNV (National Evaluation Service) and the national test for the third classes of middle school—the last one of that school grade. The tests have reading comprehension and mathematics as their objects.

Table 1 shows the percentage of correct answers regarding Italy, the Nort West of the macro-area which is the catchment area for University of Genoa, and Liguria, the region where University of Genova is the only public university. The results are presented for each grade of school, divided by gender and respectively for the reading comprehension and for mathematics. Moreover, the study shows the gap in results between males and females, and points out the ones statistically significant.

In the second year of primary school, females' results are better than males, but this difference is not significant in the examined areas, except for Liguria where the difference is in favour of females 2%, a higher value than both Italy (0.6%) and the Nort West of macro-area (1.6%) they belong to. The advantage of males over females in mathematics is statistically significant in Liguria, Italy, and Nort West of macro-area, with a more marked difference for Liguria (2.4%). In the fifth year of primary school, gender differences in reading comprehension are reduced and not significant, while for mathematics, the differences are significantly in favour of males in Italy (1.4%) and in the Nort West (1.5%) but not in Liguria, where a high variability of results persists for both genders. In the first year of middle school, gender differences are all significant: in favour of females for reading comprehension and in favour of males for math test. Reading comprehension in Liguria (2.9%) shows a gender difference lower than the national average (3.5%) and in the Nort West (3.8%), at the same time, it shows a greatest gender difference in mathematics in favour of males (3.8%) compared to the macro-area they belong to (2%) but not significantly and substantially higher than the national average (2.6%).

Table 1

The Percentage of Correct Responses by Grade of School and by Gender Relative to Reading Comprehension and to Mathematics (INVALSI, 2011)

	Grade									
	II Primary		V Primary		I Middle		III Middle		II High	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Reading literacy										
Liguria	69.3	71.3	72.7	72.6	63.8	66.7	69.3	71.5	68.1	75.2
Nort West	70.1	71.7	73.2	74.0	62.8	66.6	68.7	72.6	70.9	75.4
Italy	68.9	69.5	72.9	73.4	60.7	64.2	64.7	68.1	67.3	72.2
Mathematical literacy										
Liguria	61.8	59.4	70.2	67.4	50.7	46.9	61.1	57.1	49.8	45.3
Nort West	61.7	59.7	70.4	68.9	50.9	48.9	61.9	58.2	54.7	48.6
Italy	61.1	59.7	69.1	67.7	47.9	45.3	57.6	54.6	50.5	45.3

	Gap between females and males									
	Reading literacy					Mathematical literacy				
	Primary school		Middle school		High school	Primary school		Middle school		High school
	II	V	I	III	II	II	V	I	III	II
Liguria	2.0	-0.1	2.9	2.2	7.1	-2.4	-2.8	-3.8	-4.0	-4.5
Nort West	1.6	0.8	3.8	3.9	4.5	-2.0	-1.5	-2.0	-3.7	-6.1
Italy	0.6	0.5	3.5	3.4	4.9	-1.4	-1.4	-2.6	-3.0	-5.2

The national test supported by the third year middle school students is considered a high-stakes test, because it is associated to consequences for students who support it, since the results achieved by individual students are averaged out with their final mark. The high-stakes tests are typical of external evaluations conducted on the basis of objective and standardized measures of students' learning levels whose results assume a strategic importance for improvement. Generally, this kind of tests generate positive and negative consequences (Stobart & Eggen, 2012), that is the reason why they are opposed to the so-called low-stakes tests, tests with a low incidence for schools and students, such as comparative studies on an international scale (e.g., the PISA by the OECD, to which Italy participates with a nationally representative sample and for each region, including Liguria since 2006).

The results of the national test addressed to students of the third year of middle school are better for females in reading comprehension but not statistically significant for the examined areas, except at the national level, while there are significant differences in favour of males for the test results in mathematics, more marked in Liguria (4%), compared to that of the Nort West (3.7%) and of Italy (3%). Finally, in the second year of high school, the difference between males and females in the scores obtained is statistically significant in all areas: in favour of females for reading comprehension and in favour of males for mathematics. In Liguria, the advantage of females over males is on average 7.1%, so that the differences between males and females are higher than the national average (4.9%) and the value of the macro-area (4.5%) they belong to. On the contrary, for mathematics, the difference between males and females increases in relation to school levels in all examined areas in favour of males, but in Liguria, the gap between females and males (4.5%) is lower than what emerges at macro-area level (6.1%) and for the national average (5.2%). The analysis of data cannot prove the existence of trends, however, the analysis is able to return the performance of cohorts of students from different grades of schooling, returning a situation more gender-differentiated in high school since the early years of schooling, where the gap between females and males is lower than what appears in the upper levels. The above analysis is useful to contextualize the gender study conducted by the University of Genova through IRIS indicator which, by examining students' performance in their first university year, can indicate the degree of students' achievement in higher education, promoting continuity with the previous grades of education above mentioned, taking into account the different purposes of research, the methodological limitations and with the necessary precautions.

IRIS endorses that female students are more successful than their male fellows. In the AYs 2008/2009 and 2009/2010, female students obtained an average about 20% higher than their male fellows. Not only a numerical supremacy: 56% of females in 2009/2010, but also an academic success with an average IRIS = 41/100 of female students *vs.* 34/100 of males—A supremacy that occurs not only in humanities faculties, but also in technical/scientific ones.

IRIS is an indicator measuring student's performance expressed as a percentage value between zero in the case of students with no passed exams and 100 in the case of students who passed all the exams of their first university year curriculum with the highest rating. The value of IRIS is detected at 31 December of the year following the admission of each matriculated cohort, and it is obtained by calculating the ratio between what a student has really done, in terms of credits earned and marks obtained, and how much he could have done if he had passed all his curriculum exams with the highest ratings.

The value of IRIS is therefore the ratio:

$$\mathrm{IRIS} = \frac{\sum_{1}^{n} \mathrm{V}i\,.\,\mathrm{UC}i}{1{,}860}\,.100$$

where n = number of passed exams by December 31; Vi = mark of the i-th exam; UCi (University Credits belonging to European Credit Transfer System = ECTS credits) = number of credits on the i-th exam; 1,860 = the result of the product 31 (value conventionally attributed to the "30 cum laude") by 60 (number of UC generally provided in the first year): student's potential (Pot).

The student's efficiency value (Pre): This value is obtained by multiplying the mark by CFUs related to a given exam, and summing the products.

The student's performance (IRIS): Corresponding to the ratio between student's efficiency value and student's potential, multiplied by 100.

IRIS was then associated with the students' sending high schools. $IRIS_{S/F}$ is a measure of overall performance in the first academic year of the high school (S) former students registered in the faculty (F). $IRIS_{S/F}$ value is obtained by summing the performance values of former students coming from a high school (S) registered in the faculty (F), divided by the sum of the students' potential and multiplying the quotient by 100 to turn $IRIS_{S/F}$ in a percentage value:

$$IRIS_{S/F} = \frac{\sum_{i=1}^{n_{S/F}} Pre_{St_{i/F}}}{\sum_{i=1}^{n_{S/F}} Pot_{St_i/F}}.100$$

where $n_{S/F}$ = number of former students of a high school (S) registered in a faculty (F).

In general, graduates at high school (S) are registered in one of the 11 faculties. To give an indication of overall performance during their first university year, an estimated IRIS value was calculated without the breakdown by faculty but considering the overall university-wide students' performance measurement (AT): $IRIS_{School/Athenaeum}$ is calculated using the same criterion of $IRIS_{S/F}$:

$$IRIS_{S/AT} = \frac{\sum_{i=1}^{n_{S/AT}} Pre_{St_i/F}}{\sum_{i=1}^{n_{S/AT}} Pot_{St_i/F}}.100$$

where $n_{S/AT}$ = number of former students of a high school (S) matriculated at University of Genova (AT).

Method

Participants

The participants involved in the gender study are all "pure matriculated" of AY 2009/2010, that are 5,048 freshmen nested in five university schools. Pure matriculated are students that have finished high school on time and immediately after (in the same year) have matriculated to university. Females are the 56% of the sample census.

For this study, we assumed the new organization of University of Genova, where since the current year (2012/2013), the 11 faculties are aggregated into five university schools as follows:

(1) Polytechnic School: Architecture and Engineering;

(2) School of MPNS (Mathematical, Physical and Natural Sciences);

(3) School of Medical and Pharmaceutical Sciences: Medicine, Surgery and Pharmacy;

(4) School of Social Sciences: Economics, Law, Education and Political Sciences;

(5) School of Human Sciences: Arts and Humanities, and Foreign Languages and Literature.

We provide data also for the interfaculty courses, organized by some faculties in partnership, and the available information does not allow nest them into specific faculties or school university.

Procedures and Materials

A secondary analysis (Garbarino & Palumbo, 2006) was performed on available data provided by the

Statistical Office of the University of Genova. Descriptive analysis correlations and a regression model were carried out by SPSS (Statistical Package for Social Science) software (Di Franco, 2009). Dataset provides some variables: “student ID”, “gender”, “sending school”, “type of high school diploma”, and “mark of high school diploma”.

The analysis shows the incidence of gender in the various university schools, to understand if they are distinctly feminine or masculine and therefore the study goes on with gender differences by type of university school compared to pure matriculated with IRIS zero. Successively, the research addresses the direction and the strength of the association between IRIS score and the average rating of high school diploma differentiating by gender and type of university school. Finally, we extracted from the sample census that the group of students with IRIS different from zero. Assuming, such as null model a male from a Liceo of Genova, we did several linear regression models to study the effect of variables, such as “gender”, “residence”, “type of high school diploma”, and “mark of high school diploma” on the “IRIS variable” of students with IRIS different from zero.

On the basis of the results emerged, the Guidance Committee of University of Genova has arranged some guidelines to tackle gender inequalities particularly for entry students.

Results

Pure Matriculated: Gender Differences

The data analysis shows the existence of gender differences in students’ choice about school university courses and a higher incidence of females in the School of Humanities, where every four students, three are female. Also, in the School of Social Sciences and the School of Medical and Pharmaceutical Sciences, the incidence of females is approximately three every five pure matriculated. The situation is different in the Polytechnic School, where 60.99% of pure matriculated are male gender, while in the School of MPNS, there are no significant gender differences (see Table 2).

Table 2

Percentage of Pure Matriculated by Gender and by Type of University School

University schools	Males		Females		Total
	count	%	count	%	count
Social Sciences	701	38.4	1,124	61.6	1,825
Polytechnic	619	61.0	396	39.0	1,015
Medical and Pharmaceutical Sciences	371	39.9	558	60.1	929
Humanities	152	24.8	462	75.2	614
Math, Physical and Natural Sciences	226	50.5	222	49.6	448
Interfaculty	118	54.4	99	45.6	217
Total	2,187	43.3	2,861	56.7	5,048

Table 3

Students With IRIS Zero and Percentage Within University Schools

		MPNS	Medical and Pharmaceutical Sciences	Social Sciences	Humanities	Polytechnic	Interfaculty	Total
Males	count	62	73	166	38	146	25	510
	%	27.4	19.7	23.7	25.2	23.6	21.2	23.3
Females	count	52	58	163	68	40	12	393
	%	23.4	10.4	14.5	14.8	10.1	12.1	13.8

IRIS Zero and Kind of Gender

Students with IRIS zero are those students who have passed no exam during their university first year, and therefore, they are likely to be more in trouble than their fellows and at risk of study delays. With regard to gender differences 23.3% of male gender pure matriculated has an IRIS zero *vs.* 13.8% of females (see Table 3). For each of the five schools, the analysis of the results shows that the School of MPNS has more students with IRIS zero regardless of gender, and it is also evident that males have a quality performance lower than females.

Correlation Between IRIS and the Average Mark of High School Diploma

If we assume a statistically significant correlation between the student's high school diploma rating and his/her performance at university (0.447 significant at p-value ≤ 0.01), females seem to perform worse even if their high school diploma rating was high (see Table 4). With regard to gender, the average rating of high school diploma is more predictive for males about the possible success at university and less predictive for females, as shown by the correlation coefficients. In other words, the marks obtained in high school diploma by females attending the Schools of MPNS, Medical and Pharmaceutical, Polytechnic and Interfaculty courses are less predictive than males.

Table 4

Correlation Coefficients by University Schools and by Gender

University schools	Males	Females	Total	Distance between gender coefficients
MPNS	0.501	0.313	0.413	0.188
Medical and Pharmaceutical	0.466	0.368	0.412	0.098
Social Sciences	0.494	0.502	0.510	-0.008
Humanities	0.416	0.465	0.457	-0.049
Polytechnic	0.419	0.330	0.401	0.089
Interfaculty	0.523	0.382	0.462	0.141

Note. Correlations are significant at p-value ≤ 0.01.

A Model on Gender Performances Articulated by University Schools

How much does the kind of gender affect the good performance of university students? To answer this question, a regression model designed is useful to highlight what are the effects on IRIS of some variables entered in three stages: gender and residence place in the first model, type of high school diploma in the second model, and mark of high school diploma in the third model.

The null model is assumed to be the pure matriculated male gender, coming from the Province of Genova who attended the high school and came out with a minimum rating (60/100). The data analysis shows that overall all variables are statistically significant: A female student has a 2.75 points better performance than a male student, but if she does not come from Genova, her performance decreases by 2.60 points. Compared to a student who attended secondary school "liceo", a student coming from a technical institute has a worse performance by 8.29 points and the distance increases significantly in negative by 6.26 points in the case of a student who has attended a vocational school. Finally, one more point in high school diploma rating increases significantly IRIS by 0.78 points.

With particular regard to gender, from model 1 to model 3, the effect of gender increases and becomes significant in the School of MPNS and in Interfaculty courses in favor of male gender; it decreases and loses significance in social sciences; it decreases but remains significant in favor of female gender in the Polytechnic

School and remains constant in the School of Medical and Pharmaceutical Sciences in favor of female gender but not significant in the School of Humanities.

The model by single schools shows that in the Schools of MPNS being female is statistically significant and IRIS is 6.56 points lower than the IRIS achieved by a male student, but it is positive for the School of Medical and Pharmaceutical Sciences and for the Polytechnic School, with a higher incidence of female gender. Finally, gender is not statistically significant in the School of Social Sciences and in the School of Humanities.

The type of high school diploma is statistically significant in the School of Social Sciences (-2.85) and in the School of Humanities (-6.30), but it is not significant in the university schools providing a test for admission and more selective in entry (School of Medical and Pharmaceutical, Polytechnic School) or attracting fewer students (MPNS).

The type of high school diploma shows that attending a technical high school instead of a liceo is statistically significant in a negative way for all university schools except the School of Medical and Pharmaceutical Sciences, probably because of the effect of selective admission tests. Also the attendance of a vocational school increases significantly the distance in the School of Social Sciences and in the School of Humanities.

Finally, the rating of high school diploma is statistically significant in all university schools, with a higher incidence in the Schools of Social Sciences and of Humanities.

Table 5

Regression Models by University Schools

	MPNS	Medical and Pharmaceutical Sciences	Social Sciences	Humanities	Polytechnic School	Interfaculty	Total
Constant	-8.79	-12.57*	-24.32***	-10.15	-5.09	-23.27	-16.09***
Female	-6.56*	6.21***	0.87	-5.21	7.17***	-7.92	2.75***
No Genova	-4.66	1.06	-2.85**	-6.30***	-1.86	-2.18	-2.60***
Technical high school	-13.34**	0.06	-8.44***	-14.90***	-11.54***	-9.03	-8.29***
Vocational school	-16.726	-8.67	-14.55***	-28.31***	-11.26	-17.74	-14.55***
High school diploma mark	0.74***	0.58***	0.92***	0.95***	0.62***	0.94***	0.78***
Percentage of variance explained by the model compared to the null model	17.82	14.78	25.64	25.52	17.12	26.06	23.63

Notes. * $0.05 < p\text{-value} \leq 0.10$; ** $0.01 < p\text{-value} \leq 0.05$; *** $p\text{-value} \leq 0.01$. Underlined values are close to the significance threshold: $p\text{-value} \leq 0.15$.

The model in Table 5 is the third model of a regression analysis carried out by blocks for each university school and for the overall university, in which the effect of gender varies with the varying of the elements inserted in the model. Table 6 shows in summary that from model 1 to model 3, the effect of gender on IRIS score increases and becomes significant in the School of MPNS and in Inter-faculty courses in favour of male gender; it decreases and loses significance in the School of Social Sciences; it decreases but remains significant in favour of female gender in the Polytechnic School; and it remains constant in the School of Medical and Pharmaceutical Sciences in favour of female gender but not significant for the three models in the School of Humanities.

Table 6

Regression Model: Trend of Gender Effect on Overall IRIS and by University Schools

	MPNS ↑	Medical and Pharmaceutical Sciences =	Social Sciences ↓	Humanities ↑	Polytechnic ↓	Interfaculty ↑	Total ↓
Model 1	-5.61	6.66***	4.17***	-1.21	10.10***	-1.20	4.69***
Model 2	-6.59	6.62***	4.01***	-1.29	8.85***	-4.45	4.22***
Model 3	-6.56*	6.21***	0.868	-5.21	7.17***	-7.92	2.75***

Notes. * 0.05< p-value ≤ 0.10; *** p-value ≤ 0.01; Underscored coefficients are close to the significance value (p-value ≤ 0.15).

Discussion

The data analysis shows that students who did not pass any exam in their first university year (IRIS zero) are predominantly male gender; the correlation analysis between the high school diploma rating and the academic performance shows an unpredictable trend of females' university performance than males; eventually, the regression model shows the significance degree and the effect of gender variables on performance. These results show also the different characteristics of university schools and can be useful to define new guidance actions based on an evidence approach.

In the School of Medical and Pharmaceutical Sciences and in the Polytechnic School, there are more males with IRIS zero, better performances of females and a lower level of predictability than males about their future performance: Here, females are better and have a higher performance, therefore, it would be necessary to activate stronger guidance actions for males.

In the School of Social Sciences and School of Humanities, there are more males with IRIS zero and there is the same level of predictability about their future performance for both males and females. Females are better and therefore males need a stronger guidance, but there is a need of stronger guidance even during the transition of students from high school to university to avoid the effect due to the fact that many students can matriculate at those two schools without passing an admission test and therefore, many fail to continue studying; while the other schools are much more selective and eventually, and their students seem to be the best matriculated.

In School of MPNS, there are a high number of students with IRIS zero regardless of gender: Here, males have a better performance but females show less predictability than males about their future performance, therefore, it would be necessary to activate stronger guidance activities for females.

In Interfaculty courses (here, courses belong mainly to scientific area), there are more males with IRIS zero, but at the same time, better males' performances; females show less predictability than males about their future performance, therefore, it would be necessary to activate stronger guidance activities for females.

Conclusions

The gender study shows the existence of gender differences in students' choice at the end of high school, which reproduce the traditional stereotypes of a vocation for Humanities courses for females and Scientific courses for males. However, the interesting aspect of the analysis is that computing IRIS indicator allows to understanding that females usually perform better than males during their first year of the academic studies.

In conclusion to show their superiority in the technical/scientific faculties and university schools, girls must first prove their "courage" to enter and overcoming hard stereotypes: For any male, only professions for men, while women's jobs are housework, services, and education that is old stereotypes which still influence educational choices causing a gender segregation in the labor market and an underrepresentation of women in crucial and well-paid professional sectors. Stereotypes fed by all media especially TV. Stereotypes against which even school does little, there are few laboratories, training periods, and career guidance. So, males avoid certain disciplines, considering them too feminine while the girls are convinced to be not up to some faculties and their educational choices are consequential, even against their natural inclinations.

Moreover, gender differences on students' performance emerged between university schools.

Finally, even if the type of high school diploma is a predictable variable, the score of high school diploma is not so a valid indicator, such as studies showed (Gay & Triventi, 2011). However, the different predictability of this variable per different school universities suggests new research questions focused on aspects, such as student engagement and motivation versus dropping out, on which the Guidance Committee of the University of Genova has started to reflect.

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