CHILDREN'S SCIENTIFIC KNOWLEDGE IN MOROCCO: A GENDER APPROACH ANALYSIS TIMSS'S SCORES DECOMPOSITION

Aomar Ibourk
Professor of Economics, University of Marrakech
Director of GRES: Research Group of Social Economics,
Cadi Ayyad University, Marrakesh, Morocco

E-mail: aomaribourk@gmail.com

Abstract
This work is one of works trying to understand, and to assess the differences of children educational achievement by genre. In fact, this work tries to find answers of two sequential questions: can we accept the hypothesis, often allowed, which stipulates that boys are more performing than girls in science subjects? If yes, how to analyze a possible difference in terms of its determinants? In this regard, we'll try to explain the achievement differences between boys and girls in the 4th year of primary using TIMSS-2011's database. The applied methodology is the decomposition developed by Oaxaca and Blinder (1973), and generalized by Neumark (1988) and Oaxaca and Ransom (1988, 1994). Even if our results confirm that the girls are more performants than boys, the performance of the educational system and Moroccan is still very mediocre in general.

Keywords: *Achievement, education, gender gap, Morocco, TIMSS*

Introduction

The establishment of an educational system able to integrate children is indispensable to the development of the national scientific and technological productivity, and therefore to the socio-economic development. Then, thinking about the scientific knowledge, and performance, among young children is necessary to understand the mechanisms of basic knowledge transmission and to elaborate a better scientific policy.

In many developing countries, including Morocco, the insufficiency in term of enrolment is present in all regions, particularly within the country side. Illiteracy touches an important number of individuals. Even worse, no social development means can be realized without investing in the population, particularly through knowledge diffusion, extending possibilities and choices, and eliminating barriers separating citizens from their goals[1].

From this viewpoint, Morocco has claimed, since the end of 1990, the implementation of a societal project of sustainable development, centered on the human capital, and the reconciliation between the imperative of economic competitiveness and the requirement of the social equity and the democratic participation in a context characterized by a sustainability of resources (the initiative was, and is still, supported by the highest political authority of the country: "the king MOHAMED VI"). This awareness of the need of the education system development, added to voluntarily to make of the children learning a lever of the socio-economic development, pushed the Moroccan authorities to deploy considerable efforts which results caused an undeniable advances in terms of access (enrolment rates)[2].

In spite of this quantitative aspect, the problem of educational achievement evaluation by gender has retained the attention for several decades. It was primarily a problem of girls' poor performance. Now, the problem is become a problem of boys'meager performance. Even if there is no visible difference between girls and boys in regard to the intelligence and the general skills, the discrepancy of the educational path of girls and boys in matters of math and science achievement is remarkable, especially within the countries of the MENA region (TIMSS 2011 : Trends in International Mathematics and Science Study).[3]

This work is one of works trying to understand, and to assess the differences of children educational achievement by genre. In fact, this work tries to find answers of two sequential questions: can we accept the hypothesis, often allowed, which stipulates that boys are more performing than girls in science subjects? If yes, how to analyze a possible difference in terms of its determinants? In this regard, we'll try to explain the achievement differences between boys and girls in the 4th year of primary using TIMSS-2011's database. The applied methodology is the decomposition developed by Oaxaca and Blinder (1973), and generalized by Neumark (1988) and Oaxaca and Ransom (1988, 1994).

For the Moroccan context, this work presents a double interest:

- On the methodological level: this contribution is, to our knowledge, one of the first applications of the micro-econometric approach in Morocco ;
- On the analytical level: the results of this work come to supplement the rare evaluation works (A. Ibourk; 2012 and 2013), and to guide the public actions and measures which aim to improvethe performance and the quality of the school system, particularly the science subject teaching and learning in primary.

This paper is structured as follow:

The first section overflew the literature review concerning the children school achievement by gender. The second section presents a brief overview of the TIMSS-2011's database. Then, we expose the used methodology, and we analyze the variances in order to identify the differences between girls and boys according to the type of school, the community and the region. Finally, we are trying to explain these differences. A final section concludes.

The gender-gap in mathematics and science subjects: literature review

The present literature review exposes some of publications dealing with gender gaps in matter of educational achievement and development, particularly scientific achievements at the primary.

Questions concerning school achievement's gender-gap have always captivated great interest among researchers, policy makers, and all educational system stakeholders in general (Arnot et al, 2003). Some authors (Lajoie, 2004), argue that researches carried out - among girls and boys- over the past few years show some similarity in terms of intellectual abilities. Others, based on the brain development researches, claim that female babies acquire an extensive vocabulary more quickly than boys, and then they succeed easily in certain subjects (Duru-Bellat, 2004; Lemery, 2007; Fize, 2003).

Additionally, there are some other variables, rather than those correlated to personal skills, that explain the variability and the amplitude of the gender gaps in school achievements. The comprehension of the mechanisms of interaction between those variables is very appalling since we know that primary school achievements influence the overall educational pathway, particularly the future completions in the scientific subjects. The following paragraphs suggest and describe some variables that can impactthe school achievement's gender gap.

1. The effect of the nursery school

The first years of human development constitute a criticalstage of the scientific skills development. Skills and competencies that are acquired during this period influence significantly the children school achievements at the primary school and beyond it (McWayne, Green, &Fantuzzo, 2009) and (Klibanoff & al, 2006) this is why encouraging young children to learn is something much more valuable than giving them the ability to read fairy story. More and more evidences demonstrate that the mathematics and the sciences achievements, in the pre-school cycle,are significantly determining regarding the future achievements. From this viewpoint, Duncan & al. (2007) discovered that the skills acquired in primary and nursery school in mathematics -based on a six longitudinal studies' analysis- were very indicatingvis-à-vis the later achievements in this science. Additionally, recent longitudinal studies show that the calculation skills developed in thenursery school are very revealing of the future children's performances in the primary school (Aunola, Leskinen, Lerkkanen, &Nurmi, 2004 ; Desoete &Grégoire, 2007 ; Jordan, Kaplan, Locuniak, &Ramineni, 2007). "In general,children develop strong and deep knowledge in mathematics and science during their early development", said Ginsburg, Lee, and Boyd (2008).

2. The effect of the parents' involvement: home based school support, books' provision, media and hardwareaccessibility

A large number of researchesaffirmthat the parent support, in the school and at home, has a positive impact on the achievement of their children (X. Fan & Chen, 2001; Jeynes, 2003, 2005; Nye, Tuner, & Schwartz, 2007; Seneschal, 2006). In spite of the significant number of research focused on literacy, there now more and more studies concerningchildren'smathematics and science achievement. Those researches demonstrated that the various aspects of the parent involvement at home (for example, the expectations of the parents, the parent-child communication, encouragement regarding mathematics and science learning, and the educational media provision: office, computer, books...) are highly correlated to the improvement of the mathematics and science achievements in primary school (X. Fan & Chen, 2001; Fantuzzo, King, and Heller, 1992; becomes & al, 1983; Jeynes, 2003, 2005; Nye & al, 2007). Grolnick, Ryan &Deci (1991) have hand out the hypothesis supposing that theparents involvement influences mainly the children attributes and behavior, these laterimpactthe children'sschool achievements in mathematics and science. Similarly, the hypothetical framework provided by Hoover-Dempsey and Sandler (1995, 1997) suggested that the parents involvement increases the children intrinsic motivation vis-à-vis science and mathematics learning, and also improve the children self-regulation and self-efficacy, and therefore improve the school achievements.

3. The effect of the parents' literacy

"The cultural capital consideration is most often done by taking into account the parents' education" (Murat, 2009). In effect, the parents'education level, particularly the mother's one, is one of the most decisive factors of the child skills development; the father's one has more influence on the child school achievements (Morin Justine, 2012). [4]

4. The effect school

Bressoux (1995) showed that the family is not the only variable that influences the child's schoolachievements.He advanced that the school's climate is highly preponderant in term of achievement level. Thus, Grisay (1997) emphasizes that the intrinsic characteristics of the institutions staff can influence their performance. According to this theory, the child's results depend on the type of school attended. In effect, François and Poupeau (2008) have asserted that schools are subjectedto their social, economic, technological, cultural and political environment.However, they focused on the analysis of the spatial localization and its weight on the gender gap in school achievement.

5. Teacher's effect

According to this approach, the academic performance of students depends on their teachers; that is to say their level of competence, their professional experience, and their teaching methods (Bressoux et al, 2007). Other studies have shown that girls achieve their mathematics' tests better than boys when the examiner is a woman (Pedersen, 1968), and even when the examiner committee is mixt (Hoffman, 1961), while the committee expect better results for boys (Feldman-Summers, 1974).

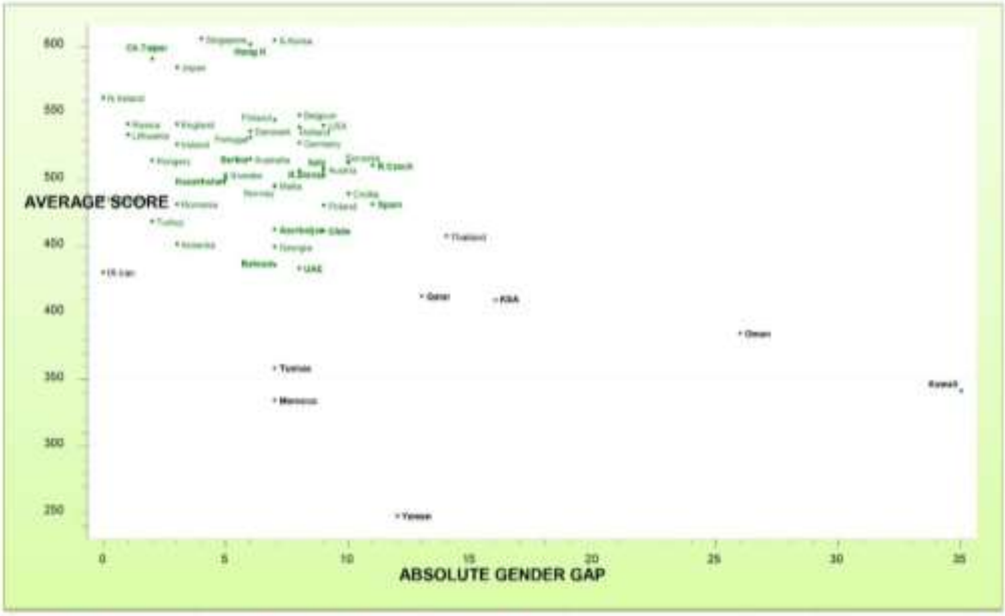
The methodology will try to explain the interconnection between the variablespresented in the literature above and the gender gap in mathematics and science achievement if it exists. Before this, we'll present the TIMSS-2011's survey in the following section.

Mathematics and science studies: performance and gender gaps among the participating countries (TIMSS-2011)

Trends in International Mathematics and Science Study –TIMSS- aresome kind of international assessments of the students' mathematical and scientific knowledge across the world. TIMSS is an international survey which aimed to assess "the ability to understand and to use the forms of mathematical and scientific skills". It targets the students of the 4th year having more than 9.5 yearsin average during the tests. The study carried out in 2011 shows that most of the participating countries have recorded "good" average scores either in mathematics thanscience: 30 countries have an average score higher than 500 in science, and 27 countries in mathematics. All the participating countries belonging to the MENA regionhave less than 500 points in average score in both mathematics and science. South Korea and Singapore occupied the two first rows in mathematics and science, while Yemen and Morocco occupied the two last positions.

In addition, the gender gaps don't exceed 10 points -for 37 countries- of absolute difference in science; this difference is 42 in mathematics. This significant number of countries, having a gender gap of 10 points or less, confirmed that girls and boys achievements in mathematical and scientific knowledge -basic and algebraic calculation knowledge- are comparable (Armstrong, 1981). Girls' superiority is found only among MENA; the gaps in the other regions, and/or countries, are somewhat not significant and the scores may be comparable (see TIMSS-2011 report). Indeed, most salient gaps were discovered within the MENA region countries (in mathematics: Oman(26), Kuwait[5] (35); in science: Bahrain (23), Tunisia (25) Qatar (26) Yemen (27) Oman (34) KSA (48) Kuwait (53)).

The figures below give an overview of the results obtained by the participating countries as well as the relationship between these results and the gender gaps:



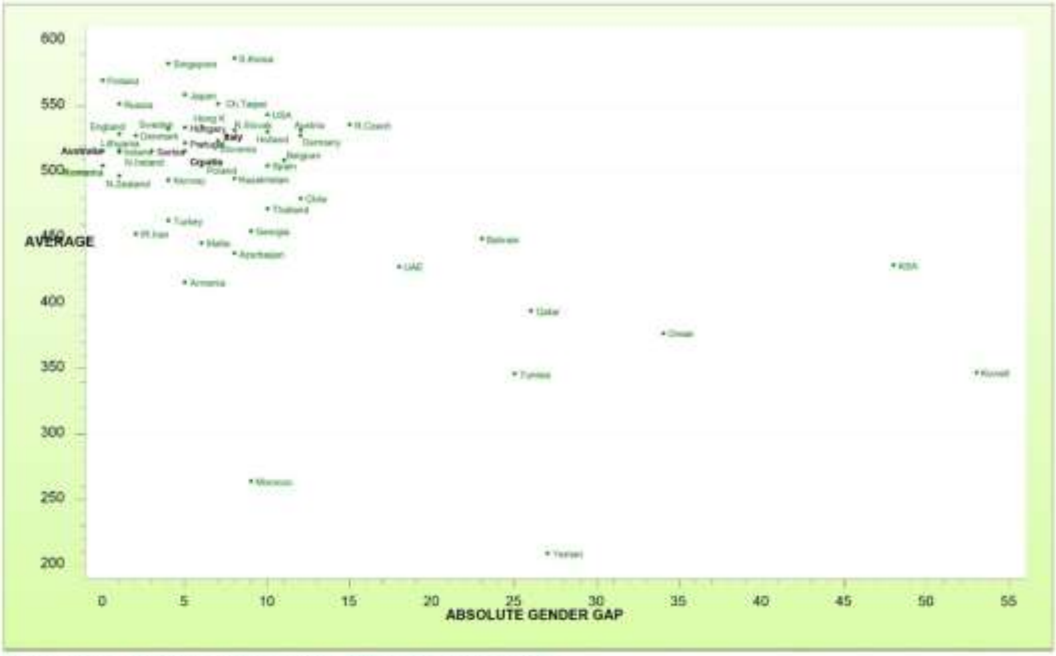
Source: author's calculation on the basis of the TIMSS-2011's survey (Stata12)

Figure 1. Relation between the scores in mathematics and the gender gap

Either in mathematics or science, most of the MENA region's countrieshave a highproportion -a model- of students unable to attain thenormal level of knowledge acquisition. In fact, none of the region countries have been able to achieve an average score equal or greater than 500 points.This fact explains partially the scientific and economic[6] gaps between the region countries and the other participating countries. On the other hand, in this era where the economy of knowledge is a particularly necessaryfor development, it's crucial to develop the intangible assets, the human capital, and generallyall activity related to education, science, research and innovation...

Nowadays, countries are continuallylooking for positioning themselveswithin the globalized knowledge economy. Only countries that are building a comprehensive strategy based on anintegrated vision, where public policies aim the qualification of the man, can conserve their socio-economic viability.

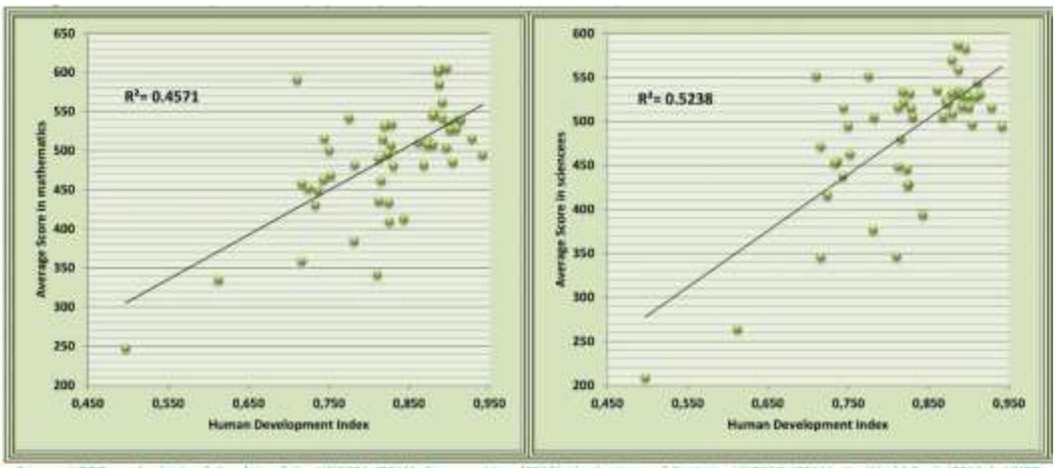
Each period of the human development brings with it new skillsdemands, new challenges and new opportunities for personal growth. Along the human lifecycle, the primary school presents a crucialperiodfull of new challenges concerning the acquisition of the basic tools for learning, and in term of personal skillsdevelopment. Then, achievements in science and mathematics influence significantly the human development level of a country. As a final point, we can approvethat the development of the children's scientific knowledge is an essential ingredient for the human development: more the children capitalize scientific knowledge; the more the country may be developed.



Source: author's calculation on the basis of the TIMSS-2011's survey (Stata12)

Figure 2. Relation between the scores in science and the gender gaps

Aware of this causality, the impossibility of realizing an economic and social development without having a population that decrypts, filtrates, and uses the extensive-knowledge; Morocco have to conceive and implementsome actions in orderto promote and improve the quality of the primary education. With this in mind, any approach that isn't taking into account the differentiation between boys and girls -in their successes and their failures- would make a little effective positive change (Brown, 2006; Francis & Skelton, 2005; Martens Lingard, Martino, Mills & Bahr, 2002; Martino &Kehler, 2007).



Source: HDRO on the basis of the data of the UNDESA (2011), Barro and Lee (2010), the Institute of Statistics UNESCO (2011), the World Bank (2011a), UNSD (2011) and the IMF (2011).

Figure 3. The relationship between the playback capability of children and human development

Gender gaps in mathematics and science: micro econometrics analysis

1. Methodology: methods and formulas

The counterfactual decomposition technique popularized by Blinder and Oaxaca (1973) is widely used to study mean outcome differences between groups. This document uses the technique in order to explain the gender gap in science and mathematics' achievements in Morocco (students issued from the 4th year primary).

Before analyzing the gender gap in reading regarding certain factors, this subsection aims to give an overview of the Blinder-Oaxaca decomposition.

Given are two groups A and B (girls and boys), an outcome variable Y, and a set of explanatory variables $X_1 : X_n$. The question is to know how much of the mean outcome difference:

$$R = E(Y_A) - E(Y_B) \quad (1)$$

Where $E(Y)$ refers to the expected value of the outcome variable, and is accounted for by group differences in the predictors, based on the following linear model:

$$Y_g = X'_g \beta_g + \varepsilon_g, \qquad E(\varepsilon_g) = 0, \qquad g \in \{A, B\} \quad (2)$$

Where X is a vector containing the predictors and a constant, the β vector contains the slope parameters and the intercept, and ε_g represents the error. The mean outcome difference can be groups in Y can be expressed as following:

$$R = E(Y_A) - E(Y_B) = E(X_A)'\beta_A - E(X_B)'\beta_B \quad (3)$$

In order to identify the contribution of group differences in predictors to the overall outcome difference, equation (3) can be rearranged as follows (see Winsborough and Dickinson, 1971; Jones and Kelley, 1984; Daymont and Andrisani 1984):

$$R = [E(X_A) - E(X_B)]'\beta_B + E(X_B)'(\beta_A - \beta_B) + [E(X_A) - E(X_B)]'(\beta_A - \beta_B) \quad (4)$$

This is a "three-fold" decomposition, that is, the outcome difference is divided into three parts:

$$R = E + I + C$$

- The first part amounts to the part of the differential that is due to group differences in the predictors (the "endowments effect"):

$$E = [E(X_A) - E(X_B)]'\beta_B$$

- The second component measures the contribution of differences in the coefficients (including differences in the intercept):

$$I = E(X_B)'(\beta_A - \beta_B)$$

- The third summand is an interaction term accounting for the fact that differences in endowments and coefficients exist simultaneously between the two groups:

$$C = [E(X_A) - E(X_B)]'(\beta_A - \beta_B)$$

The decomposition (4) is formulated from the viewpoint of the group B. Of course, the difference can be expressed in a similar manner from the viewpoint of the group A, which gives the following decomposition:

$$R = [E(X_A) - E(X_B)]'\beta_A + E(X_A)'(\beta_A - \beta_B) + [E(X_A) - E(X_B)]'(\beta_A - \beta_B) \qquad (5)$$

The estimation of the components of the decompositions (4) and (5) is straightforward. Let $\hat{\beta}_A$ and $\hat{\beta}_B$ be the least squares estimates for β_A et β_B, obtained separately from the two group-specific samples. Furthermore, use the group means $\overline{X}_A$ et $\overline{X}_B$ as estimates for $E(X_A)$ and $E(X_B)$. Based on these estimates the decompositions (4) and (5) are computed as:

$$\hat{R} = \overline{Y}_A - \overline{Y}_B = (\overline{X}_A - \overline{X}_B)'\hat{\beta}_B + \overline{X}'_B(\hat{\beta}_A - \hat{\beta}_B) + (\overline{X}_A - \overline{X}_B)'(\hat{\beta}_A - \hat{\beta}_B) \qquad (6)$$

and

$$\hat{R} = \overline{Y}_A - \overline{Y}_B = (\overline{X}_A - \overline{X}_B)'\hat{\beta}_A + \overline{X}'_A(\hat{\beta}_A - \hat{\beta}_B) + (\overline{X}_A - \overline{X}_B)'(\hat{\beta}_A - \hat{\beta}_B) \qquad (7)$$

So far, these methods of decomposition have mainly been applied in the context of linear regression models. However, in many cases, the explanation of themean outcome differences requires non-linear estimation. So, the OLS estimates become inconsistent.

If one is interested in the marginal effects of a latent censored outcome variable Y, the strategy would be to use the Tobit estimator in the standard Blinder-Oaxaca decomposition in equations (4) and (5). However, the conventional decomposition method leads to erroneous predictions of the components of the decomposition equation if we aim at analyzing the observable corner solution outcome variable. In this case, an alternative decomposition method must be applied (see Bauer and Sinning, 2006).[7]

2. The data

This work useindividual data, obtained from the TIMSS-2011's survey, concerning 5893 students issuedfrom the 4th year of primary and belonging to 273 schools. Girls represent 47% of our sample while 53 % are boys. 67% of these students are urban and 33% are rural. By type of school, 11.2 per cent of the pupils attend private schools, 13.4% satellite schools, 15.8 per cent central schools, and 59.6 per cent are issued from autonomous schools.

3. The variables

The variable to explain is the score obtained during the TIMSS tests. The average score of our sample is 335.37 in mathematics and 266.26 in science (Table1). The average gender-gap's score is almost 8% points in math and 11 in science. The following graphs show the densities of scores recorded in mathematics and science.

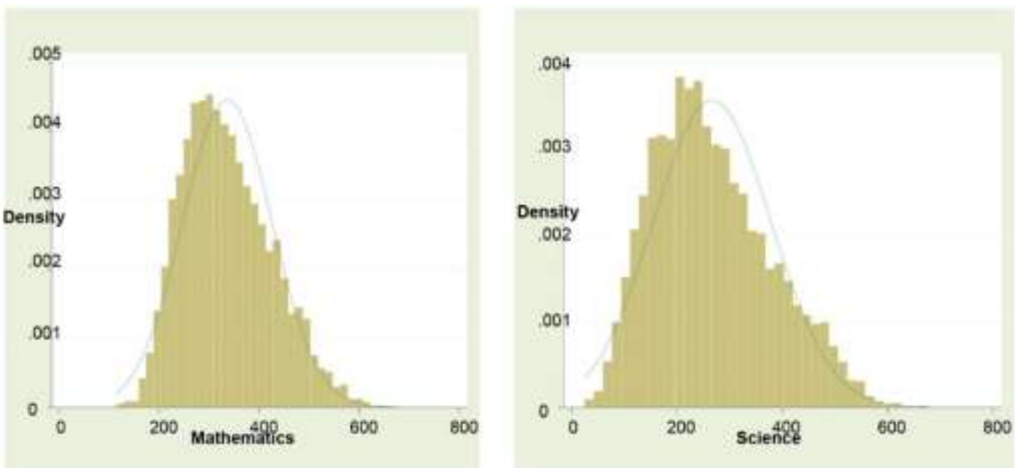


Figure 4. Density of the in mathematics and science scores

Source: author's calculation on the basis of the TIMSS-2011's survey (Stata12)

Seven variables are used –in the decomposition- in order to assess the Moroccan students' achievements. The student'sage, support at home, the lengthof the nursery schoolperiod(variable scale), the type of school, the sex and the age of the instructor, educational material possession, and the educational level of the mother. [89]

Finally, the characteristics of the school, and its localization, will enable us to understand the mechanism of interaction between the school environment and the gender-gaps in mathematics and science achievements. For this, we use an ANOVA analysis in order to identify the key period features of the influence exercisedby the cited characteristics on the gender-gaps in mathematics and science achievements.

4. The differences of average scores of girls and boys: results of the ANOVA analysis

The findings indicate that girlsalways have a higher, and significantly different, average scores than boys (at the level of mathematics or/and science, localities, and type of school). The satellite schools record the most significant gender gap with 18 points of difference in mathematics and 20 points in science. The private and central schools are the only forms of school where there are no significant gender gaps.In addition, the most interesting-scores are recorded at private schools (in mathematics or science).

Table 1. Gender-gapsin the average score according to the type of school, and the locality

Mathematics		Average	SD	F-stat	Proba	SCIENCE		Average	SD	F-stat	Proba
TYPE OF SCHOOL											
SATILLETE SCHOOL	Boys	307.3090	89.0130			SATILLETE SCHOOL	Boys	226.6423	105.4140		
	GIRLS	325.1246	97.7436	8.334	,004		GIRLS	246.5138	116.2493	7.361	,007
	Total	315.6723	93.5855				Total	235.9706	111.0158		
AUTONOMOUS SCHOOL	Boys	321.3482	78.7393			AUTONOMOUS SCHOOL	Boys	251.2137	102.5046		
	GIRLS	329.7003	74.6075	11.770	,001		GIRLS	262.4615	99.0518	12.378	,000
	Total	325.2334	76.9483				Total	256.4458	101.0565		
CENTRAL SCHOOL	Boys	318.7512	97.8384			CENTRAL SCHOOL	Boys	245.2876	116.9600		
	GIRLS	321.4047	91.2453	,208	NS		GIRLS	250.9718	110.7492	,659	NS
	Total	320.0044	94.7467				Total	247.9723	114.0508		
PRIVATE	Boys	440.8003	72.5811			PRIVATE	Boys	366.0744	95.0098		
	GIRLS	433.5757	66.6737	1.978	NS		GIRLS	381.3186	86.4943	,504	NS
	Total	437.2223	69.7644				Total	363.7192	90.8618		
MIDDLE OF RESIDENCE											
URBAN	Boys	340.8144	88.97016			URBAN	Boys	273.9485	112.12735		
	GIRLS	347.6430	82.49499	7.040	,000		GIRLS	282.6743	106.00344	7.115	,000
	Total	344.0290	86.04073				Total	278.0563	109.36189		
RURAL	Boys	312.9515	92.15545			RURAL	Boys	235.2538	110.99648		
	GIRLS	323.9332	93.47302	7.827	,000		GIRLS	251.1660	113.73630	11.237	,000
	Total	318.1020	92.91684				Total	242.7169	112.54636		
TOTAL SAMPLE	Boys	331.4980	90.98956			TOTAL SAMPLE	Boys	261.0105	113.21738		
	GIRLS	339.7523	87.00940	14.360	,000		GIRLS	272.1882	109.63045	16.817	,000
	Total	335.3790	89.22889				Total	266.2660	111.67645		

Source: author's calculation on the basis of the TIMSS-2011's survey (SPSS)

The analysis by locality demonstrated that urban children have the best attitude toward mathematics and sciences with respectively 344.02 and 278.05 points, whilerural children capitalized more inferior scores with 318.10 in mathematics, and 242.71 in sciences. This fact is may be due to the schools'proximity, the important number of educational constructs, and the availability of the learning materials-in number and in quality- for the first group of children; whereas the second group is the most vulnerable relating to the benefits mentioned above. To finish, we mention that the average score of the satellite schools'students reflects the fact that these students are facing serious difficulties in terms of scientific learning.

The following table gives more details concerning the reality of children'sscientific knowledge capitalization and its gender gaps in Morocco.

5. The Oaxaca and Blinder decomposition : findings

Table 2 presents the results of the decomposition of the natural logarithm scores'gaps in mathematics, and science. The method proposed by Oaxaca and BLINDER allows decomposing the scores gender's gaps in three components. The firstpart corresponds to the differential assigned to the individual characteristics of each group.The second part reflects the impact of the explanatory variables on the scores' differential. Finally, the third component matches with the simultaneous effect of groups' characteristics and varia-blesheterogeneity between groups.

First of all, we notice that the total scores' differential is significant in mathematics and science. The findings show that there isa gender gap of 3.1 per cent in mathematics and 6% in science –for the benefit of girls-; thisdifference is distributed as follow:

- Differences in term of the characteristics make girls more performants than boys by 0.85% in math, and 1.94% in science;
- An additional gap of 1.82% in math, and 3.51% in science, is the result of the difference of the effects caused by the explanatory variables in each model;
- The interaction between differences in terms of characteristics and explanatory variables' effects explains 0.5 % of the gender gap[10] in mathematics and science achievements.

Detailed results of the decomposition allowed us distinguishing the non-significant variables from the significant ones (partially significant or/and globally significant).

A. Non-significant variables

Some variablesaren'tsignificantly determining the level of the gender gap. There are fivenon-significant variables:the size of the class, the teacher gender, the teacher experience, the attendance of a private school, and the education level of the mother.

Table 2. Decomposition Oaxaca and BLINDER differential of scores (Stata12)

Variables	Mathematics				Science			
	Overall	Endowments	Coefficients	Interaction	Overall	Endowments	Coefficients	Interaction
Computer		-0.000374	0.0112*	-0.000817		-0.000684	0.0235**	-0.00171
		(0.000388)	(0.00671)	(0.000599)		(0.000673)	(0.0115)	(0.00111)
Office		-0.000582	-0.0148**	0.00101*		-0.00148*	-0.0393***	0.00270**
		(0.000396)	(0.00645)	(0.000606)		(0.000812)	(0.0111)	(0.00134)
Internet		3.86e-05	-0.0113**	-0.00144*		0.000257	-0.0188**	-0.00238*
		(0.000501)	(0.00535)	(0.000799)		(0.000862)	(0.00920)	(0.00136)
Age of the student		-0.00426***	-0.113	-0.00287		-0.0115***	-0.105	-0.00266
		(0.00139)	(0.0689)	(0.00177)		(0.00255)	(0.118)	(0.00302)
Size		1.48e-05	0.0218	-3.38e-06		2.06e-05	0.0320	-4.97e-06
		(0.000611)	(0.0286)	(0.000140)		(0.000851)	(0.0492)	(0.000205)
Teacher gender		-8.50e-05	0.00714	-4.11e-05		-0.000135	0.0117	-6.71e-05
		(0.000361)	(0.00703)	(0.000179)		(0.000573)	(0.0121)	(0.000293)
Teacher experience		0.000182	-0.0205	-0.000198		0.000374	-0.0270	-0.000262
		(0.000243)	(0.0164)	(0.000284)		(0.000482)	(0.0283)	(0.000414)
Satellite		1.78e-05	-0.00464*	0.000182		0.000104	-0.00851*	0.000335
		(8.05e-05)	(0.00271)	(0.000332)		(0.000220)	(0.00467)	(0.000606)
Private		-0.00268	0.00491	-0.000414		-0.00381	0.00761	-0.000642
		(0.00216)	(0.00306)	(0.000420)		(0.00307)	(0.00527)	(0.000680)
Mather education		5.30e-05	0.00222	3.90e-05		8.32e-05	4.27e-05	7.49e-07
		(0.000147)	(0.00371)	(0.000121)		(0.000233)	(0.00639)	(0.000112)
Support		-0.000798	-0.00333	-0.000521		-0.00264**	-0.000880	-0.000137
		(0.000661)	(0.00584)	(0.000917)		(0.00121)	(0.0100)	(0.00157)
Group 1	5.771***				5.470***			
	(0.00496)				(0.00844)			
Group 2	5.803***				5.530***			
	(0.00490)				(0.00828)			
Difference	-0.0317***				-0.0594***			
	(0.00697)				(0.0118)			
Endowments	-0.00848***				-0.0194***			
	(0.00309)				(0.00502)			
Coefficients	-0.0182***				-0.0351***			
	(0.00654)				(0.0113)			
Interaction	-0.00506**				-0.00483			
	(0.00231)				(0.00400)			
Constant			0.102				0.0894	
			(0.0787)				(0.135)	

Stata 12 ; (...)SD; *** p<0.01, ** p<0.05, * p<0.1

B. Significant Factors

At the end of our study on the gender-gap-kind in mathematics and science achievements–for thefourth class of primary-, it is appropriate to makesome comments.The detailed analysis of the decomposition gives six variables that aresignificantly influencing the scores' gendergaps. Except"support at home" that has a partial impact (effect on science's gender gaps), the other five variables (possession of a computer, possession of an office, possession of the internet, the student'sage, and the attendance of asatellite school) influence both gendergaps in science and mathematics:

- When the girls'age exceeds the boys one by one year, the girls'average score surpassesthe boys one by 0.4 % in math and 1.15% in science;
- Every one point increasing of the home support index,forgirls,–the same index is unchanging for boys-generates0.26% more out-achieving in science in the profit of girls. This observation allows us to propose the implementation of a national campaign, for example, that encourages parent to support their children at homein order to guarantee the improvement of the scientific achievements and the gender parity in matter of scientific knowledge;
- The learning's material possession (a desk, computer, or internet) is significantly affecting the gender-gap. Indeed, the possession of a computer tends to reduce the gap in math, and in science, in favor of boys; while the possession of the internet, and/or of a desk, benefits more to girls. Beyond this fact, the learning via internet-TIC in general-provides an effective solution to the physical and geographical obstacles confronted by certain children. However, this solution needs the development of a greater autonomy (children must learn with no teacher orientation).
- Finally, frequenting satellite schools is significantly extending the gender gap (in math and science) in favor of girls, thus rejecting the hypothesis that girls are more vulnerable to satellite schools compared to boys.

Conclusion

The previous developments deal with the question of the educational discrimination. This question has been at the heart of the public debate since at the end of the 1990's. Even if our results confirm that the girls are more performants than boys, the performance of the educational system and Moroccan is still very mediocre in general. This is why it is essential to deploy more efforts in several areas, to conduct studies on the causes of the current situation, and to imply every man, who think, in the development of the necessary medication.

The medication process success is with no doubt dependent on the behavior'schange of all stakeholders. This change depends essentiallyon some factors related to the middle of residence (which affects the type of school attended), the learning material's availability (office, computer, books etc…), the parentsupport, the generalization of the nursery school frequentation, and the continuous updating of the educational pedagogy.

To the issues cited above, it is necessary to supplement other factors which fall within the framework of a double logic of development:

- The development of a new project based on the development of psychosocial skills;
- The development of a system of monitoring/evaluation of children'spsychosocial skills and support for children's personal projects (especially for children who have salientproblems).

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[1] The rate of illiteracy has reached 38.45 per cent for the population aged 10 years and over, and 43% for the aged 15 and more, said Mr. Birou at a press conference devoted to the presentation of the results of "the national survey on illiteracy, the non-enrolment and the enrolment rates in Morocco" 2007. According to the latest figures of the

HCP relating to 2009, the rate of illiteracy is 39.7 %. The ministry of finance, him, given for 2010 a rate of 30% only.

[2] According to the report "An Assessment of the progress made in Africa in the achievement of the Millennium development goals, 2011 ", Morocco is 5 to 10 percent of the target of 95% in net enrolment rate in primary

[3] Ina V. S. Mullis, Michael O. Martin, Pierre Foy, and Alka Arora: "TIMSS 2011: International Results in Mathematics".

[4] Morin Justine. Memory: "The involvement of parents in the education of their child(s) in the elementary school of differences according to social environment? ". Framed by Billouet Pierre in 2012.

[5] The values between parentheses denote the absolute differences of the scores achieved by girls and boys.

[6] Except for the group of countries of the Gulf OPEC members, and importers of human resources, according to the global index of the knowledge economy IKE-2013.

[7] Bauer and Sinning: "An Extension of the Blinder-Oaxaca Decomposition to Non-Linear Models", Oct-2006.

[8] 0 =No support; 1 =one or two times per month; 2 =a o two times per week; 3 =all days.

[9] 0 =Not enrolled in pre-school; 1 =one year or less; 2= between 1 and2 years; 3 =2 years ; 4= between 2 and 3 years; 5= 3years and more.

[10] 1.85 =(0.002/0.108) * 100