



eCOMMONS

Loyola University Chicago  
Loyola eCommons

---

Topics in Middle Eastern and North African  
Economies

Quinlan School of Business

---

9-1-2012

# Quantification of the Relationship Poverty- Education in Algeria: A Multinomial Econometric Approach

Samir B-E. Maliki  
*University of Tlemcen*

Abderrezak Benhabib  
*University of Tlemcen*

Abdelnacer Boutedja  
*University of Tlemcen*

---

## Recommended Citation

Topics in Middle Eastern and North African Economies, electronic journal, Volume 14, Middle East Economic Association and Loyola University Chicago, September, 2012, <http://www.luc.edu/orgs/meea/>

This Article is brought to you for free and open access by the Quinlan School of Business at Loyola eCommons. It has been accepted for inclusion in Topics in Middle Eastern and North African Economies by an authorized administrator of Loyola eCommons. For more information, please contact [ecommons@luc.edu](mailto:ecommons@luc.edu).

© 2012 the authors

## Quantification of the Poverty-Education Relationship in Algeria: A Multinomial Econometric Approach

Samir B-E. MALIKI<sup>1</sup>, Abderrezak BENHABIB<sup>2</sup> and Abdelnacer BOUTELDJA<sup>3</sup>  
University of Tlemcen, Laboratory MECAS, Algeria

### Abstract

*The purpose of this paper is to quantify the relationship between poverty and education using a multinomial logit measurement. Starting with a subjective measurement of households' poverty in the region of Tlemcen, we then move to an application of a multinomial regression approach to non school factors as the main determinants of the relationship between poverty and education. Education plays a vital role in economic and social development, and due to its complexity and multidimensionality, should be comprehended within a general approach, in order, first to pinpoint the relevant factors for its efficiency, and second, to assess its outcome (individual and collective). It follows therefore, that higher levels of education and enlarged access will lead to productivity gains and income, hence reduced inequality and poverty. The current practice chosen for this analysis consists of two steps: in the first, we attempt to identify a subjective poverty measure. In the second step; beside using a theoretical analysis of the linkage between poverty and education on the basis of domestic data, we want to better understand the linkage between poverty and education through the use of a multinomial regression model drawn on a survey of 500 households in the region of Tlemcen. We consider that the main variables that may determine this linkage are non school factors such as the level of education of the head of the households, gender, education expenditure, and any additional courses for children. The outcome shows that for the first model (very poor relative to intermediate) the individual housing, the collective housing, the gender (male), the age of the head (20-25) and the level of instruction of the head of the household have lesser probability for the very poor to improve his well off level to a higher i-e intermediate situation. For the second model (poor relative to intermediate) only the individual housing, the university level of male, the level of instruction and expenditures for education have a lesser probability for the poor to improve his well off level to a higher i-e intermediate situation. The last model (rich to intermediate) shows that only the age category under 31 years for the head of the household, the primary and secondary level of instruction of the male head of household, the instruction level of female head of household have a negative impact on the rich level, i-e that the subjective probability of feeling rich is questioned through these variables leading to a transfer from a rich level to intermediate real level. Our approach can help Algerian policy makers to identify the actual missing variables that are important to the education sector, particularly if the state maintains his actual policy.*

**Key words:** Poverty – Education – MDG - Multinomial – Algeria.

**Jel Codes:** I320-I290

---

<sup>1</sup> **Corresponding author:** Dr. Samir Baha-Eddine MALIKI, Associate Professor, Faculty of Economics and Management, MECAS laboratory, University Abou Bekr Belkaid, Tlemcen, Algeria Email : [samirmaliki@yahoo.fr](mailto:samirmaliki@yahoo.fr)

<sup>2</sup> Professor Abderrezak BENHABIB is Director of the Laboratory MECAS, University Abou Bekr Belkaid Tlemcen, Algeria, Email: [abenhbib1@yahoo.fr](mailto:abenhbib1@yahoo.fr)

<sup>3</sup> Dr. Abdelnacer BOUTELDJA, Associate Professor, Faculty of Economics and Management, University Abou Bekr Belkaid, Tlemcen, Algeria Email : [abdelbout@yahoo.fr](mailto:abdelbout@yahoo.fr)

## **Introduction**

After the independence in 1962, the access to education in Algeria has become a legitimate right with the compulsory schooling of the children from 6 to 15 years, and recently (2008) from 3 to 5 years. This policy is recognized as a structuring element of human development. In fact, the last data on education show that the average rates of completion for a group of children approximate 95, 2% in the primary education and 66, 2% at the collegial level. However, Schools dropouts (Benhabib & Ziani, 2002) estimated over the period 1999-2006 turn around 536.000 per year with 68, 9% coming from the compulsory teaching cycles (RNDH, 2008). Some studies (Sandra Mr. Fortier, 2007) found that within their school environment (Wedgwood, 2007) poor children tend to perceive negatively the impact of their poverty on their social and academic conditions. Besides, poverty of the households tends to increase the risk of vulnerability of the children, particularly on their education (McKay S and Atkinson, 2007). Sen (1997) admits that poverty is also a source of improvement of human capital added to the value of national productivity.

Poverty is defined (Sen 1993) as a privation of basic needs and capacity. This may suggests that a tentative explanation of the relationship between poverty and education can be broadly categorized into one of potentially two levels of analysis, private and social returns. There are different approaches to modelling the determinants of poverty (Foster, 1984; Ravallion,1996; Sen, 1976). The current practice chosen for this analysis consists of two steps: in the first, we attempt to identify a subjective poverty measure. In the second step; beside using a theoretical analysis of the linkage between poverty and education on the basis of domestic data (CNES, 2008) , we want to better understand the linkage between poverty and education through the use of a multinomial regression model drawn on a survey of 500 households in the region of Tlemcen . We consider that the main variables that may determine this linkage are non school factors such as the level of education of the head of the households, gender, education expenditure, and any additional courses for children.

Our approach can help Algerian policy makers identify the actual missing variables that are of utmost importance to the education sector, particularly if the state maintains his actual policy.(Figure 1 in Appendix).In Algeria, the actual indicators confirm the existence of some improvements in poverty level. According to the Ministry of employment and national solidarity, there is a decrease of 2.3 % from 2006 relatively to 2000.

Yet, in contrast, the UNDP considers that the number of poor exceeds the 10 millions, a figure that is far from the 723,020 poor presented by the ministry of employment and solidarity. Moreover, the CNES (2007) report shows that the proportion of the population living below the nutritional poverty threshold has moved from 3.6% in 1988 to 1.6% in 2004, representing 518000 individuals.

The global poverty threshold that concerned 3.98 million individuals in 1995 decreased to 2.2 million in 2004 with an annual average decrease of 6.37%. The measurement of the Human Poverty Index (HPI) shows a decreasing index between 1995 and 2005 from 25.23 to 16.60 (CNES, 2007). We shall be tackling in the first part the factors affecting the relationship between education and poverty through the presentation of some theoretical issues of education from one angle that deals with the role of education in determining well off levels of individuals through the presentation of an integrated approach.

### **1. Factors affecting the relationship between education and poverty**

Education is considered as the cornerstone of social development and a principal means of improving the character and pace of individual welfare. Education which is considered the most important constituent of social capital, however defined plays a determinant role in expanding human capabilities<sup>4</sup>, contributes to improving well off levels of individuals.

Human capital theory, elaborated in Chicago at the end of the fifties (Shultz 1963; Becker 1975) stipulates that education increases productivity, incurs an opportunity cost, and has pay off in terms of increased returns (whether private or social). Productivity increases, it is argued, would lead to higher returns in forms of increased income. It follows therefore, that higher levels of education and enlarged access will lead to productivity gains and income, hence reduced inequality and poverty. As discussed above, education plays a vital role in economic and social development, and due to its complexity and multidimensionality, should be comprehended within a general approach, in order, first to pinpoint the relevant factors for its efficiency, and second, to assess its outcome (individual and collective).

Before introducing the approach, we shall present an outcome of economic analysis to education. Currently, the economic analysis of education relies mainly on the production function approach, which is how school factors-inputs, teaching, management and organisation can cost-effectively promote cognitive skill acquisition (see for example, Hanushek 1986, 1994, Purky and Smith 1983; Lockheed and Verspoor 1991; Harbinson and Hanushek 1992; and Glewwe and others 1995). Most of these studies measure educational output by using students' scores on standardized achievement tests, drop out rates, repetition rates, attendance rates or decision to pursue schooling. Based on this approach, an optimal set of resources can be defined and policies that would likely produce high levels of educational achievements can be instituted and decided on.

Interpreting these research point to the following conclusions:

---

<sup>4</sup> According to Sen and Drèze (1989) a persons capability is “ a set of functioning bundles, representing the various beings and doings that a person can achieve with his or her economic, social, and personal characteristics”

- 1. Empirical work of education production function has had mixed success in explaining scores on standardized achievement tests;*
- 2. There are divergences between the different findings on a definite systematic relation between key input and student performance;*
- 3. There are difficulties with the analytical approaches and methodologies used due partly to peculiarities in the available data, varying perspectives of the researchers, and missing key elements of the educational process;*
- 4. Schools are differentially effective in producing learning and the impact of each input differs from school to school;*
- 5. Educational performance is a product of a complete, difficult, contentious and conflicting interactions of factors and agents who participate in the schooling process, and, there is a strong need for more research on the merits of incentive systems, decentralisation and school-based management .*

One set of factors influencing learning is “school factors” which consist of physical inputs (facilities, instructional materials and expenditure per pupil) and pedagogical inputs which include curriculum, time, teacher education, experience and salary, school attendance, and repetition rates. Management and organisation factors are concerned with class size, staff stability, collegial relationship, parental and community involvement, school autonomy, evaluation schemes. However, research has demonstrated that non-school factors, such as gender, individual indicators, family factors like educational expenses , housing conditions and parental education’s can be the most important determinants of performance during school life and after .

Figure 2 (shown in Appendix) (Benhabib & Ziani, 2002) portrays on one hand the impact of these non school factors (individual, family and community) on school achievement (school factors), and on the other hand, on Societal outcome that comprehend instructional output (cognitive and non cognitive), behavioural output and the well off degree( private and social ) derived from such output like earnings and job promotion. Recent evidence from different studies reveals that the most important Determinants of child learning capacity are among all non school factors such as: Gender, family factors such as educational expenses, parental education, income level, number of siblings and child rearing behaviour. Research shows that a deficiency in any of the factors listed above is responsible for an important part of school drop outs in developing countries (Todaro 1983) and is likely to lead to an exacerbation of a poverty state of any individual. In fact, school and non-school factors are vital components of the determinants of what we have called societal outcome; instructional output (learning), behaviour output, and well off degrees.

The box on the top of the chart portrays a set of exogenous variables related to political, legal, economic, social, cultural, technological and ecological policies ( P.L.E.S.C.T.E factors) (Benhabib, 2000), which influence development, and educational policies.

## 2. Education and poverty: possible linkages

This second part deals with sample and data selection, the presentation of the model and finally, a summary of the main results.

### 2.1. Sample and data collection

The survey method that has been adopted relates to a sample of 500 households covering twelve communes representative of the fifty three communes of the Wilaya (department) of Tlemcen taken on a random basis over of the last Algerian official census indicators (1998). We apply a multinomial logit model to determine possible linkages between poverty and education. As presented above, we shall concentrate on non school factors as determining indicators to poverty levels.

### 2.2. The multinomial logit model

Let  $m$  be the number of alternatives reflecting four levels of well off (very poor, poor, intermediate and rich.) based on categories built upon subjective responses. For computational purposes, the alternatives are labelled by an index  $j = 1, \dots, m$ , so that the response  $y_i = j$  is a nominal (not an ordinal) variable. Let  $n_j$  be the number of observations with response  $y_i = j$  and let  $n = \sum n_j = 1$   $n_j$  be the total number of observations. Suppose that, apart from the choices  $y_i$ , also the value  $x_i$  of  $k$  explanatory variables are observed,  $I = 1, \dots, n$ . The first element of  $x_i$  is the constant term  $x_{i1} = 1$ , and the other elements of  $x_i$  represent characteristics of the  $i$ th individual. A possible model in terms of stochastic utilities is given by (Heij, 2004).

$$U_i^j = u_{ij} + \varepsilon_{ij} = x_i' \beta_j + \varepsilon_{ij} \dots \dots \dots (1)$$

Where:

$x_i$ : is a  $k * 1$  vector of explanatory variables for individual  $i$

$\beta_j$ : is a  $k * 1$  vector of parameters for alternative  $j$

Further  $u_{ij} = x_i' \beta_j$  represents the systematic utility of alternative  $j$  for an individual with characteristics  $x_i$

$\beta_j$ : Measures the relative weights of the characteristics in the derived utility.

$\varepsilon_{ij}$ : are individual-specific and represent unmodelled factors in individual preferences.

The estimation of the multinomial logit probabilities become:

$$p_{ij} = \frac{e^{x'_i\beta_j}}{\sum_{h=1}^m e^{x'_i\beta_h}} = \frac{e^{x'_i\beta_j}}{1 + \sum_{h=2}^m e^{x'_i\beta_h}} \dots\dots\dots (2)$$

The estimation by maximum likelihood with respect to the parameters  $\beta_j, j = 2, \dots, m$

Show the following results:

$$\log(L_{MNL}(\beta_2, \dots, \beta_m)) = \sum_{i=1}^n \left( \sum_{j=2}^m y_{ij} x'_i \beta_j - \log \left( 1 + \sum_{h=2}^m e^{x'_i \beta_h} \right) \right) \dots\dots\dots (3)$$

### 3. Results and interpretation

In this regression, the outcome variable is the subjective poverty of the household computed on the basis of four levels of Subjective poverty representing four different situations: very poor, poor, intermediate and rich. In our study, the intermediate household situation is the reference group because it represents the highest marginal percentage (44, 4%). As such, it is used for the estimation of the model, starting from very poor relative to intermediate and poor relative to intermediate and finally rich relative to intermediate. The small p-value from the LR test, <0.00001, would lead us to conclude that at least one of the regression coefficients in the model is not equal to zero.

Since the parameter estimates are relative to the reference group, the standard interpretation of the multinomial logit is that for a unit change in the predictor variable, the logit of outcome relative to the reference group is expected to change by its respective parameter estimate given that the variables in the model are held constant.

Table 1(shown in Appendix) presents a summary of the independent variables used in the study. Responses of the head of the household as far as subjective poverty is concerned, show that 19.2% are very poor, 32.4 % poor, 44.4% intermediate and only 4% are rich. As a result, we find that out 51.6% of the households are poor.

Concerning the variable gender, the head of the household is male for 432 households, and 60% of the head of the households are more than 50 years old and only 5.6% are under 31 years old. Results show, moreover, that more than half (56.8%) of the head household males have either a primary instruction or without. For the female gender, the percentage is important (79.6%), and only 0.8% has a university level.

The household's expenditure for additional courses concerns only 226 households. The majority devote a monthly expense of 1500 AD. The percentage of the household's budget devoted to

education may help explain the monetary linkage between poverty and education. In fact results show that 56% of the households spend less than 20% of their budget on education.

Table 2 and 3 (shown in Appendix) shows the contribution of the two explanatory variables taken together. It can be seen that by including the two variables and the constants (intercepts) the model reduces the  $-2\text{Loglikelihood}$  by 183,399 compared with the results when excluding the two variables. This difference that is highly significant expresses the contribution of the two explanatory variables taken together. Table 4 of the output presents the Likelihood Ratio Tests and shows the individual contribution of each of the explanatory variables. It can be seen that all explanatory variables make a significant contribution to the model except *Inst\_female* denoted by the instruction level of the female head of the household. The final element of the output is the model itself. We have three models based on the category intermediate as a reference category. Thus, the first section of the output compares very poor with intermediate, the second compares poor with intermediate and the third rich with intermediate.

The results of the gender (male =1) effect is significant for very poor (0.008) and poor (0.053), but not for rich (0.414). As far as the results for very poor are concerned, the level of instruction of the household head (male or female) have a negative impact on the subjective poverty.

The outcome shows that for the first model (very poor relative to intermediate) the individual housing, the collective housing, the gender (male), the age of the head (20-25) and the level of instruction of the head of the household have lesser probability for the very poor to improve his well off level to a higher i-e intermediate situation.

For the second model (poor relative to intermediate) only the individual housing, the university level of male, the level of instruction and expenditures for education have a lesser probability for the poor to improve his well off level to a higher i-e intermediate situation. The last model (rich to intermediate) shows that only the age category under 31 years for the head of the household, the primary and secondary level of instruction of the male head of household, the instruction level of female head of household have a negative impact on the rich level, i-e that the subjective probability of feeling rich is questioned through these variables leading to a transfer from a rich level to intermediate real level.



## References

- Amemiya, T. 1985, *Advanced econometrics*, Cambridge : Harvard University Press.
- Becker . G.S. 1975 .“ Human Capital : a Theoretical and empirical Analysis” . Columbia University Press, New York
- Benhabib A & Ziani T, 2002, « Arab educational systems : through the attainment of better achievements» in *Arab development challenges of the new Millennium* “Published in ASHGATE Edition july London , ISBN 07546 1869 2 ; British Library reference 3389609174927 ;library of congress 2002100075
- Benhabib A. 2000 “ Economie et gestion d’entreprise” Office des publications Universitaires OPU 2000 Alger.
- Charles D. Raab,1994, « Theorising the Governance of Education », *British Journal of Educational Studies*, Vol.42,No. 1, Special Edition: Education Policy Studies, March, pp. 6-22. In : <http://www.jstor.org/stable/3122217>
- Christine Bruniaux, Bénédice Galtier,2003, « L’étude du devenir des enfants des familles défavorisées : L’apport des expériences Américaines et Britanniques », les papiers du C.E.R.C, N° 2003 – 01, Juillet, Paris, France
- CNES (2007), *Rapport national sur le développement humain en Algérie 2006*, en coopération avec le PNUD, Algiers.
- David Lim,1996, « Explaining Economic growth », Ed Edward Elgar Publishing Limited, Cheltenham, United Kingdom, P150. ISBN: 1 85898 1 190.
- Hanushek, Eric A. 1986 .“ The Economic of schooling : production and efficiency in public schools ,”*Journal of Economic Literature* 24 (3).
- Hanushek, Eric A.1994.“Money Might Matter Somewhere :A responses to hedges, laine, and Greenwald *Educational Researcher* 23 (4) .
- Harbison, Ralph W. and Eric A. Hanushek . 1992. *Educational performance of the poor : Lessons from rural Northeast Brazil* . New York : Oxford University Press .
- Heij Christiaan and al.(2004, “ *Econometric methods with applications in business and economics*”, Oxford University Press
- Maliki S.B-E. , Benhabib A. and Charmes J, “Households poverty and water linkages: Evidence from Algeria” *Topics in Middle Eastern and North African Economies*, electronic journal, Volume 11, Middle East Economic Association and Loyola University Chicago, September 2009,in <http://www.luc.edu/orgs/meea/volume11/meea11.html>
- Marky, Stewart C., and Marshall S. Smith. 1983. *Effective Schools: a review*. *Elementary School Journal*. 83 (4)
- Noel McGinn and Luzete Pereira, 1992, “Why States Change the Governance of Education: An Historical Comparison of Brazil and the United States”, *Comparative Education*, Vol. 28, No. 2, pp. 167-180. In: <http://www.jstor.org/stable/3099429>
- Rapport mondial sur le suivi de l’éducation pour tous E.P.T 2003 / 2004, « Genre et éducation pour tous : Le pari de l’égalité », Chapitre 03 : Pourquoi les filles restent elles bloquées ? U.N.E.S.C.O, 2003/ 2004. p 139. In: <http://unesdoc.unesco.org/images/0013/001325/132513e.pdf>
- Richard Black and Howard White, « Targeting Development: Critical perspectives on Millennium Development Goals », P 179, First published 2004 by Routledge, New York.

Rita Asplund, « A macroeconomic perspective on education and inequality », The Research Institute of The Finnish Economy, No. 906, Helsinki, Finland, 23 / 03 / 2004 P 13. ISSN 0781-6847.

Ruth Wedgwood, 2007, Education and poverty reduction in Tanzania, International Journal of educational Development 27 383–396

Shultz, T.M . 1963. The Economic Value of Education . Columbia University Press.

Stephen Machin and Sandra McNally, « Education and child poverty: A literature review », Joseph Rowntree Foundation, London School of Economics 2006. ISBN 978 1 85935 477 3 9

Tarling Roger, 2009, Statistical Modelling for Social Researchers Principles and Practice, Routledge, New York.

Todaro P. Michael .1982 .Economic Development in the Third World . Longman Inc., New York

**Appendix**

**Table1 :Case Processing Summary**

		N	Marginal Percentage
Subjective poverty	Very poor	96	19,2%
	Poor	162	32,4%
	Intermediate	222	44,4%
	Rich	20	4,0%
Housing	individual	282	56,4%
	collectif build	78	15,6%
	precarious	140	28,0%
Gender of the head of the household	Male	432	86,4%
	Female	68	13,6%
Age of the head of the household	20 - 25	6	1,2%
	26- 31	22	4,4%
	32 - 37	16	3,2%
	38 - 43	72	14,4%
	44 - 49	84	16,8%
	50 - 60	174	34,8%
	60 ans et Plus	126	25,2%
Instruction level of male households head	Without	172	34,4%
	Primary	112	22,4%
	Lower	96	19,2%
	Secondary	86	17,2%
	University	30	6,0%
	Professional Training	4	,8%
Instruction level of female households head	Without	256	51,2%
	Primary	142	28,4%
	Lower	90	18,0%
	Secondary	8	1,6%
	University	4	,8%
% of household budget consacred to education	0	30	6,0%
	10 %	90	18,0%
	15 %	44	8,8%
	20 %	116	23,2%
	25 %	84	16,8%
	30 %	56	11,2%
	40 %	28	5,6%
	50 %	44	8,8%
	60 %	8	1,6%
Households expenditure for additional courses	0	374	74,8%
	500 DA	36	7,2%
	1000 DA	38	7,6%
	1500 DA	22	4,4%
	2000 DA	12	2,4%
	2500 DA	12	2,4%
	3000 DA	6	1,2%
Valid		500	100,0%
Missing		0	
Total		500	
Subpopulation		245(a)	

a The dependent variable has only one value, observed in 243 (99,2%) subpopulations.

**Table 2 : Model Fitting Information**

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	1164,087			
Final	980,688	183,399	99	,000

**Table 3 : Goodness-of-Fit**

	Chi-Square	df	Sig.
Pearson	2321,856	633	,000
Deviance	873,263	633	,000

**Table 4 : Likelihood Ratio Tests**

Effect	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	980,688(a)	,000	0	.
NPM	1012,143(b)	31,455	3	,000
Housing	1321,861(b)	341,173	6	,000
Gender	1004,676(b)	23,989	3	,000
AGE	1023,039(b)	42,352	18	,001
INST_Male	13104,810(b)	12124,122	15	,000
INST_Female	989,910(b)	9,222	12	,684
Budg_Educ	1567,262(b)	586,575	24	,000
EXP_Cours	737,593	.	18	.

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

b The log-likelihood value cannot be further increased after maximum number of step-halving.

**Table 5 : Classification**

Observed	Predicted				Percent Correct
	Very poor	Poor	Intermediate	Rich	
Very poor	62	16	18	0	64,6%
Poor	16	100	42	4	61,7%
Intermediate	16	26	160	20	72,1%
Rich	0	2	6	12	60,0%
Overall Percentage	18,8%	28,8%	45,2%	7,2%	66,8%

Table 6 : Parameter Estimates

Subjective poverty(a)		B	Std. Error	Wald	Df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Very poor	Intercept	5,191	4,259	1,486	1	,223			
	NPM	,188	,083	5,117	1	,024	1,206	1,025	1,419
	[Housing=1]	-1,744	,384	20,622	1	,000	,175	,082	,371
	[Housing=2]	-1,229	,574	4,576	1	,032	,293	,095	,902
	[Housing=3]	0(b)	.	.	0	.	.	.	.
	[Gender=1]	-1,180	,442	7,137	1	,008	,307	,129	,730
	[Gender=2]	0(b)	.	.	0	.	.	.	.
	[AGE=1]	-,039	2,033	,000	1	,985	,962	,018	51,715
	[AGE=2]	,845	,849	,991	1	,320	2,327	,441	12,279
	[AGE=3]	,502	1,711	,086	1	,769	1,652	,058	47,210
	[AGE=4]	,657	,540	1,478	1	,224	1,929	,669	5,562
	[AGE=5]	,606	,548	1,223	1	,269	1,833	,626	5,363
	[AGE=6]	1,465	,407	12,937	1	,000	4,327	1,948	9,614
	[AGE=7]	0(b)	.	.	0	.	.	.	.
	[INST_Male=1]	-,815	1,231	,438	1	,508	,443	,040	4,948
	[INST_Male=2]	-1,662	1,228	1,830	1	,176	,190	,017	2,108
	[INST_Male=3]	-1,156	1,234	,879	1	,349	,315	,028	3,531
	[INST_Male=4]	-1,440	1,230	1,372	1	,242	,237	,021	2,639
	[INST_Male=5]	-2,030	2,433	,696	1	,404	,131	,001	15,469
	[INST_Male=6]	0(b)	.	.	0	.	.	.	.
	[INST_Female=1]	-4,452	3,591	1,537	1	,215	,012	,000	13,269
	[INST_Female=2]	-4,913	3,595	1,868	1	,172	,007	,000	8,437
	[INST_Female=3]	-5,489	3,607	2,317	1	,128	,004	,000	4,852
	[INST_Female=4]	-7,592	4,002	3,598	1	,058	,001	,000	1,287
	[INST_Female=5]	0(b)	.	.	0	.	.	.	.
	[Budg_Educ=0]	1,726	1,613	1,145	1	,285	5,619	,238	132,596
	[Budg_Educ=1]	,410	1,528	,072	1	,788	1,507	,075	30,120
	[Budg_Educ=2]	-,376	1,643	,052	1	,819	,686	,027	17,176

	[Budg_Educ=3]	,138	1,540	,008	1	,929	1,148	,056	23,487
	[Budg_Educ=4]	-,402	1,567	,066	1	,797	,669	,031	14,421
	[Budg_Educ=5]	,220	1,583	,019	1	,889	1,246	,056	27,729
	[Budg_Educ=6]	,894	1,607	,309	1	,578	2,445	,105	57,060
	[Budg_Educ=7]	,752	1,591	,223	1	,636	2,121	,094	47,912
	[Budg_Educ=8]	0(b)	.	.	0	.	.	.	.
	[EXP_Cours=0]	,058	1,187	,002	1	,961	1,059	,103	10,854
	[EXP_Cours=1]	,357	1,288	,077	1	,782	1,429	,115	17,823
	[EXP_Cours=2]	-,607	1,299	,219	1	,640	,545	,043	6,947
	[EXP_Cours=3]	-1,368	1,472	,863	1	,353	,255	,014	4,562
	[EXP_Cours=4]	,003	1,836	,000	1	,999	1,003	,027	36,652
	[EXP_Cours=5]	,048	,000	.	1	.	1,049	1,049	1,049
	[EXP_Cours=6]	0(b)	.	.	0	.	.	.	.
Poor	Intercept	2,244	6,884	,106	1	,744			
	NPM	,090	,079	1,286	1	,257	1,094	,937	1,277
	[Housing=1]	-1,279	,343	13,881	1	,000	,278	,142	,545
	[Housing=2]	,096	,436	,048	1	,826	1,101	,468	2,587
	[Housing=3]	0(b)	.	.	0	.	.	.	.
	[Gender=1]	,926	,479	3,731	1	,053	2,525	,986	6,461
	[Gender=2]	0(b)	.	.	0	.	.	.	.
	[AGE=1]	,366	1,208	,092	1	,762	1,442	,135	15,380
	[AGE=2]	1,929	,686	7,894	1	,005	6,881	1,792	26,422
	[AGE=3]	1,941	,928	4,370	1	,037	6,963	1,129	42,954
	[AGE=4]	,242	,444	,298	1	,585	1,274	,534	3,041
	[AGE=5]	,055	,444	,015	1	,902	1,056	,442	2,523
	[AGE=6]	,499	,356	1,963	1	,161	1,647	,820	3,310
	[AGE=7]	0(b)	.	.	0	.	.	.	.
	[INST_Male=1]	1,147	2,143	,287	1	,592	3,149	,047	209,969
	[INST_Male=2]	,801	2,135	,141	1	,708	2,228	,034	146,435
	[INST_Male=3]	1,111	2,141	,269	1	,604	3,038	,046	201,704
	[INST_Male=4]	,487	2,138	,052	1	,820	1,627	,025	107,497
	[INST_Male=5]	-,396	2,549	,024	1	,877	,673	,005	99,462
	[INST_Male=6]	0(b)	.	.	0	.	.	.	.

	[INST_Female=1]	-1,017	6,320	,026	1	,872	,362	,000	86712,326
	[INST_Female=2]	-1,572	6,324	,062	1	,804	,208	,000	50104,114
	[INST_Female=3]	-1,397	6,324	,049	1	,825	,247	,000	59766,189
	[INST_Female=4]	-2,222	6,461	,118	1	,731	,108	,000	34258,827
	[INST_Female=5]	0(b)	.	.	0	.	.	.	.
	[Budg_Educ=0]	-1,089	1,390	,613	1	,434	,337	,022	5,137
	[Budg_Educ=1]	-1,821	1,274	2,044	1	,153	,162	,013	1,965
	[Budg_Educ=2]	-1,951	1,330	2,150	1	,143	,142	,010	1,929
	[Budg_Educ=3]	-,707	1,258	,316	1	,574	,493	,042	5,802
	[Budg_Educ=4]	-1,579	1,273	1,539	1	,215	,206	,017	2,500
	[Budg_Educ=5]	-1,498	1,286	1,357	1	,244	,224	,018	2,779
	[Budg_Educ=6]	-1,404	1,351	1,081	1	,299	,246	,017	3,467
	[Budg_Educ=7]	-1,108	1,350	,674	1	,412	,330	,023	4,655
	[Budg_Educ=8]	0(b)	.	.	0	.	.	.	.
	[EXP_Cours=0]	-1,968	1,069	3,390	1	,066	,140	,017	1,135
	[EXP_Cours=1]	-1,849	1,161	2,535	1	,111	,157	,016	1,533
	[EXP_Cours=2]	-1,726	1,143	2,280	1	,131	,178	,019	1,673
	[EXP_Cours=3]	-2,027	1,198	2,863	1	,091	,132	,013	1,379
	[EXP_Cours=4]	-,955	1,615	,350	1	,554	,385	,016	9,116
	[EXP_Cours=5]	-,506	,000	.	1	.	,603	,603	,603
	[EXP_Cours=6]	0(b)	.	.	0	.	.	.	.
Rich	Intercept	10,764	6504,142	,000	1	,999	.	.	.
	NPM	-,020	,141	,020	1	,886	,980	,743	1,292
	[Housing=1]	,359	,935	,147	1	,701	1,432	,229	8,950
	[Housing=2]	,352	1,218	,083	1	,773	1,421	,130	15,482
	[Housing=3]	0(b)	.	.	0	.	.	.	.
	[Gender=1]	,951	1,164	,667	1	,414	2,588	,264	25,354
	[Gender=2]	0(b)	.	.	0	.	.	.	.
	[AGE=1]	-1,012	3,224	,099	1	,754	,364	,001	201,694
	[AGE=2]	-,008	1,730	,000	1	,996	,992	,033	29,457
	[AGE=3]	1,365	1,569	,757	1	,384	3,916	,181	84,864
	[AGE=4]	-,203	,904	,050	1	,822	,816	,139	4,802
	[AGE=5]	-,270	,933	,084	1	,772	,763	,123	4,753



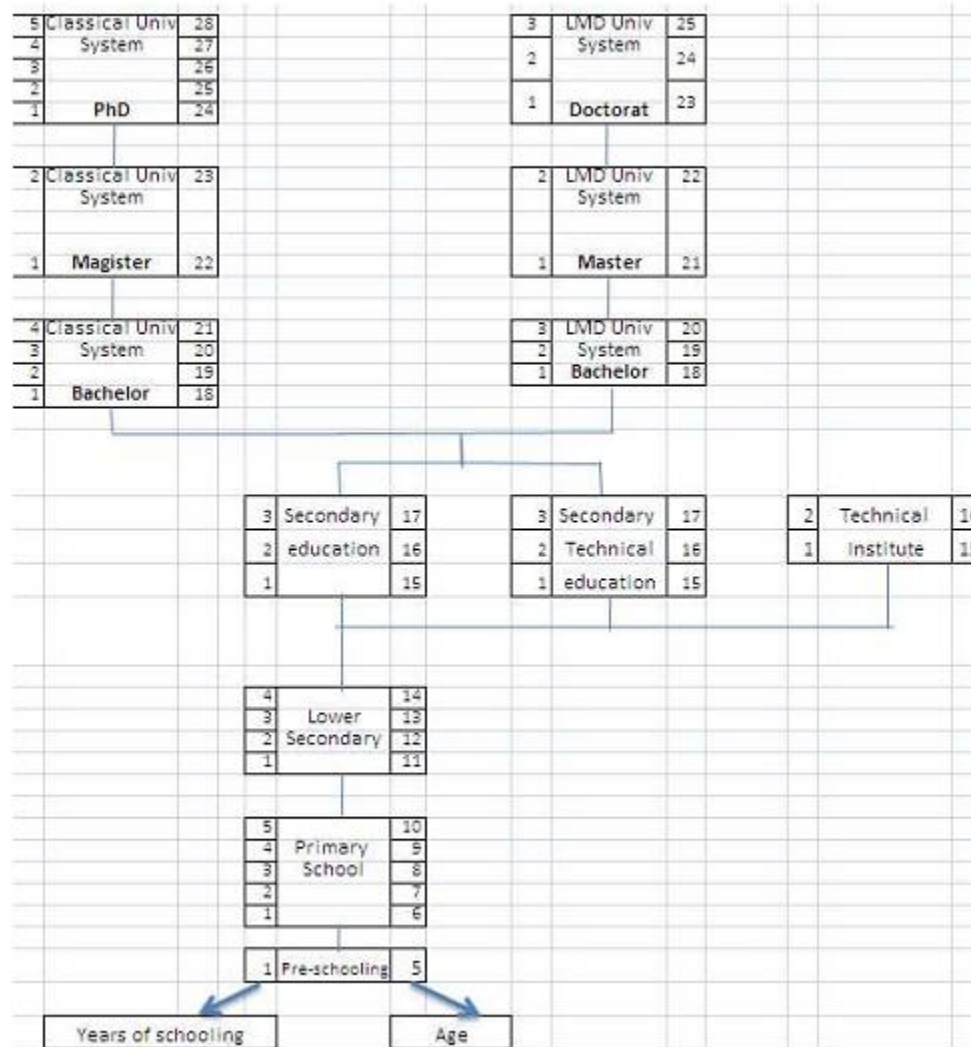
[AGE=6]	,438	,659	,442	1	,506	1,549	,426	5,634
[AGE=7]	0(b)	.	.	0	.	.	.	.
[INST_Male=1]	,154	5,094	,001	1	,976	1,167	,000	25296,113
[INST_Male=2]	-1,076	5,143	,044	1	,834	,341	,000	8138,362
[INST_Male=3]	-,331	5,093	,004	1	,948	,718	,000	15556,397
[INST_Male=4]	-1,008	5,107	,039	1	,843	,365	,000	8104,381
[INST_Male=5]	5,191	5,102	1,035	1	,309	179,623	,008	3952151,865
[INST_Male=6]	0(b)	.	.	0	.	.	.	.
[INST_Female=1]	-2,416	11,677	,043	1	,836	,089	,000	776503590,580
[INST_Female=2]	-2,381	11,682	,042	1	,839	,092	,000	812016726,961
[INST_Female=3]	-2,100	11,696	,032	1	,858	,122	,000	1106207958,25 2
[INST_Female=4]	-4,250	12,182	,122	1	,727	,014	,000	333754540,948
[INST_Female=5]	0(b)	.	.	0	.	.	.	.
[Budg_Educ=0]	2,268	2,743	,684	1	,408	9,662	,045	2089,294
[Budg_Educ=1]	,359	2,630	,019	1	,891	1,432	,008	248,036
[Budg_Educ=2]	2,684	2,532	1,124	1	,289	14,639	,102	2092,126
[Budg_Educ=3]	2,050	2,541	,651	1	,420	7,770	,053	1129,784
[Budg_Educ=4]	,468	2,508	,035	1	,852	1,597	,012	217,962
[Budg_Educ=5]	-,045	2,570	,000	1	,986	,956	,006	147,237
[Budg_Educ=6]	1,572	2,783	,319	1	,572	4,817	,021	1125,856
[Budg_Educ=7]	,414	2,641	,025	1	,875	1,513	,009	267,639
[Budg_Educ=8]	0(b)	.	.	0	.	.	.	.
[EXP_Cours=0]	-12,996	6504,129	,000	1	,998	,000	,000	.(c)
[EXP_Cours=1]	-13,433	6504,129	,000	1	,998	,000	,000	.(c)
[EXP_Cours=2]	-14,100	6504,129	,000	1	,998	,000	,000	.(c)
[EXP_Cours=3]	-13,848	6504,129	,000	1	,998	,000	,000	.(c)
[EXP_Cours=4]	-7,818	6504,129	,000	1	,999	,000	,000	.(c)
[EXP_Cours=5]	-12,910	6504,130	,000	1	,998	,000	,000	.(c)
[EXP_Cours=6]	0(b)	.	.	0	.	.	.	.

a The reference category is: Intermediate.

b This parameter is set to zero because it is redundant.

c Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

**Figure 1: Education System in Algeria**



**Figure 2:** The learning system revisited: a multidimensional schematic framework

