Education Statistics Bulletin

The School Population Map and Poverty Indices

Introduction

As part of its financial and budgetary operations, the Ministère de l'Éducation du Québec (MEQ) grants substantial funding envelopes to the school boards each year. The distribution of funding is based on the characteristics of each school's student population, but also on the students' socioeconomic and family environments.

In recent years, the MEQ has focused particularly on students' educational success, with special attention being given to reducing the dropout rate in secondary schools. Along these lines, the implementation of success plans in spring 2000 led the MEQ to conduct an in-depth analysis of the factors linked to students' success in school and also prompted the partners in the network to set objectives (targets) based on previous results and on the characteristics of their student populations.

For many reasons, then, related both to budget and evaluation, the MEQ and its partners have to be familiar with the socioeconomic characteristics of students' family environments. Given that the MEQ is not directly responsible for gathering the data used to determine these characteristics, it must adopt a methodological approach enabling it to calculate poverty measures that take into consideration variables with a recognized influence on educational success. Furthermore, for the purpose of providing an overview of the geographical breakdown of the disadvantaged student population, these indices must be associated with territorial units, which in turn calls for the creation of a school population map.

The School Population Map

For several years, the MEQ used a "map of disadvantaged sectors" (our translation).[1] This map, which comprised 589 territorial units outside of the Island of Montréal, was published in 1977, and was based on the geographical breakdown of the Québec population as observed in the 1971 census. Since the late 1980s, the Conseil scolaire de l'Île-de-Montréal (CSIM) has used its own "map of school planning units" (our translation).[2] This map, whose geographical boundaries were based on the 1986 census data, comprises 448 territorial units. Its geographical delimitation is thus more precise than that of the MEQ's map, and consequently allows for a more in-depth analysis of disadvantaged areas.

In order to update and refine the geographical delimitation of the territorial units, the MEQ decided, in spring 1998, to create a school population map covering all of Québec. The school boards, which obviously are familiar with the territories they serve, were invited to participate in this initiative, and each school board was responsible for delimiting the geographical boundaries of the units on its territory, based on information provided by the MEQ.[3] Thus, the French-language school boards[4] established their territorial units on the basis of the following criteria:

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1 Québec, Ministère de l'Éducation, Direction des politiques et des plans, *Les secteurs défavorisés du Québec (April 1977)*.

2 Conseil scolaire de l'Île-de-Montréal, *Carte des unités de planification scolaire : indices de défavorisation socio-économiques*, annual publication.

3 In order to help the school boards delimit the boundaries of their territorial units, the MEQ provided geographical maps showing the breakdown of students by postal code.

4 Only the French-language school boards defined the geographical boundaries of the units in their territories, even in cases where a board shared its territory with an English-language school board. The English-language school boards subsequently validated the geographical delimitation proposed by the French-language school boards.

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• A unit must comprise approximately 600 students (aged 5 to 16 as at September 30, 1998). This criterion was imposed in order to ensure that relevant data taken from the 1996 census were applied to all units. These data have to do with level of schooling, income and employment. For example, as concerns income-related data, there must be at least 325 households in a given unit.

• The territory of one unit must adjoin another.

• The population in a given territorial unit must be as homogeneous as possible in terms of social, economic and family characteristics. This criterion was established to ensure that the indices calculated for a given unit reflect the actual circumstances of as many families as possible.

This initiative was launched in spring 1998 and completed in fall of the same year, and resulted in the adoption of a school population map. This new map, which better reflects the current reality of Québec and boasts a degree of precision comparable to the map of the CSIM, comprises 1445 territorial units covering all of Québec, with the exception of territories served by special-status school boards.[5] The Commission scolaire de Montréal has the largest number of territorial units with 135, followed by the Marguerite-Bourgeoys, Laval and Marie-Victorin school boards with 106, 72 and 65 units respectively. At the opposite end of the spectrum, the Commission scolaire de la Moyenne-Côte-Nord and the Commission scolaire des Îles have only 2 and 3 units respectively (see Table 1 for the geographical breakdown of the territorial units).

This school population map will be updated in fall 2002. Based on school population data for 2001-2002, adjustments will be made to the geographical boundaries of the units in order to maintain a demographic balance. In some regions of Québec, student mobility and population growth mean that major changes will have to be envisaged. This update will also provide an opportunity to correct certain errors in the methodological approach. For example, in the case of certain municipalities which, in 1998, had only one rural postal code and now have several urban postal codes, it will be possible to create a number of units where before there was only one.[6] Finally, this update will also allow certain improvements to be made, especially in areas where the population characteristics lack homogeneity.

Poverty Indices

The global poverty index formerly used by the MEQ

For several years, the MEQ used a global poverty index. This index was calculated for each of the 589 territorial units on the map of disadvantaged sectors. Several variables, the values of which were taken from the Canadian census of 1971, were used to calculate this global index. First, nine variables were applied to each of the 589 units. Then other variables were added, according to the settlement pattern. For example, for highly urbanized and small-town areas, 14 variables were used to calculate the global index, whereas 11 variables were used for rural and non-urbanized areas. These variables were socioeconomic (parents' income, father's occupation or inactivity, quality of housing, etc.) and cultural (mother's level of schooling, school attendance, incidence of single-parent families, etc.). The methodological approach underpinning the calculation of this global index was rigorous; however, its greatest weakness was its obsolete nature, given that the variables used were more typical of the society and economy of Québec during the 1970s.[7]

The poverty index based on low-income cut-offs

Since the late 1980s, when data from the 1986 census became available, the CSIM has calculated a poverty index for each of its 448 territorial units, based mainly on the low-income cut-off (LICO) but also taking into consideration the following:

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5   The Littoral, Cree and Kativik school boards are not included in the school population map.

6   The student's postal code is the smallest geographical unit in the MEQ's files. This means that the territory of a unit cannot be smaller than the territory corresponding to a postal code. This update will involve correcting the geocoding (cartographic location) of certain postal codes.

7   Québec, Ministère de l'Éducation, Direction des politiques et des plans, *Les secteurs défavorisés du Québec* (April 1977). Pages 78 to 111 present a detailed description of the methodological approach and the variables used (in French only).

- the proportion of families living below the LICO line ($31682 for the Montréal area, according to the 1996 census);

- 20% of the proportion of families with an income between the LICO and the LICO plus one third (quasi low-income);

- a slight adjustment to the index obtained (low-income and quasi low-income). Three adjustment factors are used for this purpose: the proportion of families headed by lone women, parental economic inactivity and maternal undereducation (less than 9 years of schooling). The impact of this adjustment on the value of the index is only one percentage point on average, which means that it is mainly a low-income index.

This poverty index, designed by the CSIM, is used in its current form by the MEQ and has been applied to the 1445 territorial units of the school population map since 1999. However, although eminently appropriate for the territory served by the CSIM, this index becomes problematic when applied to Québec as a whole, given that LICOs vary according to population density. The 1996 census established the LICOs according to population density as follows:

- urban area (500 000 inhabitants or more): $31 682
- urban area (100 000 to 499 999 inhabitants): $27 982
- urban area (30 000 to 99 999 inhabitants): $27 338
- urban area (fewer than 30 000 inhabitants): $24 922
- rural area: $21 690

These different LICOs make interregional comparisons more difficult with regard to disadvantaged areas. When this index is applied to all territorial units in Québec, disadvantaged areas would seem to be found mainly in those units located in the downtown core of major urban centres, especially Montréal and Québec City, that is, in areas where crossing the LICO line is the most difficult. Thus, the territories of school boards that correspond to the downtown areas of these two census metropolitan areas account for 216 of the 287 most disadvantaged units,[8] according to this index (see Table 2).

The use of this index paints an essentially urban picture of disadvantaged areas. Since the calculation of the poverty index by school is based on the indices of each student's territorial unit, the general result is that schools located in the downtown core of major urban centres are the ones identified as being disadvantaged (see Table 3), and are thus given priority in the development of programs designed to foster educational success.

The MEQ's new poverty index (socioeconomic environment index)

The application of the poverty index based on LICOs to Québec as a whole prompted negative reactions in a number of areas, including more remote regions such as Abitibi-Témiscamingue, Nord-du-Québec, Saguenay-Lac-Saint-Jean, Côte-Nord, Bas-Saint-Laurent and Gaspésie-Îles-de-la-Madeleine. The partners in these regions, who must often cope with difficult situations, held that disadvantaged students could not be judged by LICOs alone.

In response to this problem, the MEQ began a study designed to assess the influence of certain socioeconomic factors on student success. Using school data and variables considered in the 1996 census, this study revealed that three of these factors had a significant impact on educational success. The following preliminary observations were applied to all 1445 units:

- The simple correlation between the proportion of undereducated mothers (women who did not complete secondary school) and academic underachievement (students who have not obtained a diploma by age 19) is 0.54.

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8   The poverty index by school is obtained by calculating the weighted average of the indices pertaining to students who attend the school in question. The schools, like the units, are then assigned a decile rank. Units and schools with decile ranks of 9 and 10 correspond to the most disadvantaged units and schools.

- The simple correlation between the proportion of families in which the parents are economically inactive[9] and academic underachievement is 0.41.

- The simple correlation between the proportion of families living below the LICO line and academic underachievement is 0.39.

Following this analysis of the correlation between each of the explanatory variables and academic underachievement, a study of the simultaneous impact of these three socioeconomic factors was conducted using simple linear regression. The findings of this study show that the variables represent 57% of the variation in academic underachievement. The most powerful explanatory variables are maternal undereducation and parental economic inactivity, since they account for 96.3% of the variance explained by the regression. The proportion of the index that actually pertains to the LICO is thus negligible, weighing in at only 3.7%. This means that, once the first two variables have been taken into account, low income actually contributes very little to explaining academic underachievement.

The results of these studies and the existence of several LICOs prompted the MEQ to develop a new poverty index that disregards LICOs. The socioeconomic environment index is henceforth based on maternal undereducation (which accounts for two thirds of the weight of the index) and parental economic inactivity. The application of this new index to the 1445 territorial units substantially modifies the geographical breakdown of disadvantaged areas; indeed, a number of school boards and regions with almost no schools or units classified as disadvantaged according to the previous index now include several such units (see Table 2).

The application of this new index has major repercussions on the geographical breakdown of schools with students from disadvantaged areas. Even though schools located in the downtown core of urban centres are still among the most disadvantaged, other schools in remote regions are now being targeted by programs designed to foster educational success (see Table 3).

Constraints linked to the use of the school population map and the poverty indices

The school population map and the poverty indices are essential, useful tools for the MEQ and its partners. However, they do have limitations, which are related to their methodological approach. For example, the indices calculated first by unit and then by school are "ecological indices." The indices pertaining to a given student are based on the characteristics observed for all of the families in his or her unit, whereas in reality, the characteristics of that student's family may be quite different. Therefore, the index attributed to this student does not always reflect his or her family circumstances. Given that each student brings to the school the value of the index of his or her territorial unit, the index calculated for the school suffers from the same distortion. Consequently, a school should not be described as being made up of disadvantaged students, but rather of students from disadvantaged areas.

Since this constraint is inherent to the methodological approach used, there is an increasingly pressing need to find an alternate solution, given that more and more special programs are being implemented in public schools, and that these schools will have a tendency to select the strongest students, as private schools do now. These students, whose family environment tends to be more favourable than that of most other students in the territorial unit, will bring the index of their unit with them to the school. As a result, the poverty index of a school that uses selective admission procedures will not be representative of the actual family characteristics of such students (probable overestimation of disadvantaged areas).

An alternate solution might call for the inclusion of a question regarding the parents' level of schooling in the declaration of student population. The MEQ would then have access to detailed information concerning the level of schooling of the parents of each student. This new information, added to the ecological variables (map and indices), would enhance the value of current poverty indices and potential comparative indices.[10]

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9   That is, people who did not work during the year preceding the census (1995, in this case).

10 Based on existing direct information concerning students' progress in school, new direct information concerning parents' level of schooling and indirect information obtained from the census using the school population map, comparative or projected results could be established for each school.

Furthermore, the indices by unit are calculated every five years, that is, based on census data. These indices, which provide information on a given situation at a precise moment in time (the date of the census), are less and less indicative of the actual situation of a unit as the date of the census recedes. The mobility of families and students and the rapid economic and cultural transformations that occur in a city or environment can diminish the value of the indices calculated over the years. Given that the indices by school are calculated every year, based on annual student enrollment but also on the characteristics observed in the census, they too become less pertinent as the date of the census becomes more distant.

Conclusion The school population map and the poverty indices have become, in recent years, strategic working tools. Indeed, both poverty indices—the one based on LICOs and the one based on maternal undereducation and parental economic inactivity—are used in the development of numerous MEQ funding programs. Within the framework of activities associated with the success plans for elementary and secondary schools, the new poverty index, calculated by school, has helped established indices for comparable socioeconomic environments. It is these comparative indices that serve as reference points for the MEQ and its partners in the network, who draw on them with a view to setting targets to be met in the coming years.

These vital activities bear witness to the increasing importance of the map and the indices in the MEQ's daily activities. It is thus essential to continue efforts to improve the quality of these tools. In addition to updating the school population map every five years, we must analyze in greater depth external factors that have an impact on the retention, success and dropout rates of elementary and secondary students. In this regard, work is currently under way that should make it possible, over the coming school year, to better define, where applicable, the economic, social and cultural factors most closely associated with educational success.

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Table 1

Breakdown of territorial units of the school population map, by administrative region and French-language school board

BAS-SAINT-LAURENT	**46**
CS des Monts-et-Marées	10
CS des Phares	16
CS du Fleuve-et-des-Lacs	8
CS Kamouraska-Rivière-du-Loup	12

SAGUENAY-LAC-SAINT-JEAN	**66**
CS du Pays-des-Bleuets	15
CS du Lac-Saint-Jean	12
CS des Rives-du-Saguenay	24
CS De La Jonquière	15

CAPITALE-NATIONALE	**115**
CS de Charlevoix	6
CS de la Capitale	38
CS des Découvreurs	24
CS des Premières-Seigneuries	39
CS de Portneuf	8

MAURICIE	**53**
CS du Chemin-du-Roy	31
CS de l'Énergie	22

ESTRIE	**61**
CS des Hauts-Cantons	12
CS de la Région-de-Sherbrooke	32
CS des Sommets	17

MONTRÉAL	**292**
CS de la Pointe-de-l'Ile	51
CS de Montréal	135
CS Marguerite-Bourgeoys	106

OUTAOUAIS	**70**
CS des Draveurs	28
CS des Portages-de-l'Outaouais	24
CS au Cœur-des-Vallées	9
CS des Hauts-Bois-de-l'Outaouais	9

ABITIBI-TÉMISCAMINGUE	**38**
CS du Lac-Témiscamingue	4
CS de Rouyn-Noranda	10
CS Harricana	7
CS de l'Or-et-des-Bois	11
CS du Lac-Abitibi	6

CÔTE-NORD	**26**
CS de l'Estuaire	13
CS du Fer	11
CS de la Moyenne-Côte-Nord	2

NORD-DU-QUÉBEC	**5**
CS de la Baie-James	5

GASPÉSIE-ÎLES-DE-LA-MADELEINE	**22**
CS des Iles	3
CS des Chic-Chocs	7
CS René-Lévesque	12

CHAUDIÈRE-APPALACHES	**90**
CS de la Côte-du-Sud	14
CS de L'Amiante	10
CS de la Beauce-Etchemin	30
CS des Navigateurs	36

LAVAL	**72**
CS de Laval	72

LANAUDIÈRE	**76**
CS des Affluents	47
CS des Samares	29

LAURENTIDES	**91**
CS de la Seigneurie-des-Mille-Iles	48
CS de la Rivière-du-Nord	24
CS des Laurentides	12
CS Pierre-Neveu	7

MONTÉRÉGIE	**274**
CS de Sorel-Tracy	11
CS de Saint-Hyacinthe	20
CS des Hautes-Rivières	30
CS Marie-Victorin	65
CS des Patriotes	50
CS du Val-des-Cerfs	25
CS des Grandes-Seigneuries	36
CS de la Vallée-des-Tisserands	18
CS des Trois-Lacs	19

CENTRE-DU-QUÉBEC	**48**
CS de la Riveraine	10
CS des Bois-Francs	20
CS des Chênes	18

QUÉBEC TOTAL	**1445**

Source: Ministère de l'Éducation, Carte de la population scolaire, 1999.

Table 2

Breakdown of territorial units with decile ranks of 9 and 10 according to the low-income index and the socioeconomic environment index, by census metropolitan area, French-language school board and administrative region

Census metropolitan areas (CMA) or administrative regions School boards	Total number of units	Units with decile ranks of 9 or 10	
		according to the low-income index	according to the socioeconomic environment index
CMA OF MONTRÉAL			
CS de la Pointe-de-l'Île	51	30	13
CS de Montréal	135	104	63
CS Marguerite-Bourgeoys	106	34	11
CS de Laval	72	13	5
CS Marie-Victorin	65	21	13
CMA OF QUÉBEC			
CS de la Capitale	38	14	9
SUBTOTAL	**467**	**216**	**114**
ADMINISTRATIVE REGIONS			
Bas-Saint-Laurent	46	1	13
Saguenay-Lac-Saint-Jean	66	3	13
Capitale-Nationale (1)	77	3	3
Mauricie	53	11	16
Estrie	61	6	11
Outaouais	70	12	16
Abitibi-Témiscamingue	38	1	11
Côte-Nord	26	0	10
Nord-du-Québec	5	0	1
Gaspésie-Îles-de-la-Madeleine	22	3	10
Chaudière-Appalaches	90	3	17
Lanaudière	76	5	10
Laurentides	91	14	18
Montérégie (2)	209	8	20
Centre-du-Québec	48	1	4
SUBTOTAL	**978**	**71**	**173**
QUÉBEC TOTAL	**1445**	**287**	**287**

Notes:

(1) Does not include the Commission scolaire de la Capitale.

(2) Does not include the Commission scolaire Marie-Victorin.

Source: Ministère de l'Éducation, Carte de la population scolaire, 1999.

Table 3

Breakdown of secondary schools with decile ranks of 9 and 10 according to the low-income index and the socioeconomic environment index, by census metropolitan area, school board and administrative region, 2001-2002

Census metropolitan areas (CMA) or administrative regions School boards	Total number of schools	Schools with decile ranks of 9 or 10	
		according to the low-income index	according to the socioeconomic environment index
CMA OF MONTRÉAL			
CS de la Pointe-de-l'Île	15	11	4
CS de Montréal	49	44	32
CS Marguerite-Bourgeoys	19	10	3
CS de Laval	21	8	2
CS Marie-Victorin	14	5	2
English-Montréal School Board	36	35	11
Lester-B.-Pearson School Board	17	3	0
CMA OF QUÉBEC			
CS de la Capitale	14	7	5
SUBTOTAL	**185**	**123**	**59**
ADMINISTRATIVE REGIONS			
Bas-Saint-Laurent	38	1	19
Saguenay-Lac-Saint-Jean	27	2	11
Capitale-Nationale (1)	45	0	2
Mauricie	26	4	6
Estrie	36	2	8
Outaouais	34	4	9
Abitibi-Témiscamingue	21	0	14
Côte-Nord	18	0	11
Nord-du-Québec	6	0	1
Gaspésie-Îles-de-la-Madeleine	29	4	16
Chaudière-Appalaches	37	1	8
Laval (2)	4	1	0
Lanaudière	31	3	8
Laurentides	36	2	10
Montérégie (3)	72	1	5
Centre-du-Québec	28	0	5
SUBTOTAL	**488**	**25**	**133**
QUÉBEC TOTAL	**673**	**148**	**192**

Notes:

(1) Does not include the Commission scolaire de la Capitale.

(2) Does not include the Commission scolaire de Laval.

(3) Does not include the Commission scolaire Marie-Victorin.

Source: Ministère de l'Éducation, Carte de la population scolaire, 1999.

Other Education Statistics Bulletins available:

- Lespérance, André. *Level of Graduation Upon Leaving the Education System*, **No. 1, November 1997**.
- Demers, Marius. *Statutory Salaries and Teaching Time of Teachers in Public Elementary and Lower Secondary Schools: A Comparison of Québec and OECD Countries*, No. 2, **November 1997**.
- Demers, Marius. *Educational Expenditure Relative to the GDP: A Comparison of Québec and OECD Countries*, **No. 3, June 1998**.
- Maheu, Robert. *Graduation from Secondary School, College and University in 1995: A Comparison of Québec and OECD Countries*, **No. 4, June 1998**.
- Beauchesne, Luc. *Secondary School and College Graduates: A Sociodemographic Analysis*, **No. 5, June 1998**.
- St-Germain, Claude. *Québec Student Achievement in Mathematics and Science: An International Comparison*, **No. 6, August 1998**.
- Foucault, Diane. *The Aboriginal School Population of Québec*, **No. 7, September 1998**.
- Demers, Marius. *The Return on Investment in Education*, **No. 8, February 1999**.
- Ouellette, Raymond. *Projections of Teaching Staff in Québec School Boards: 1996-97 to 2008-09*, **No. 9, February 1999**.
- St-Germain, Claude. *The Linguistic Situation in the Education Sector, 1997-98*, **No. 10, March 1999.**
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- Dufort, Jean-Pierre. *Secondary School Vocational Education*, **No. 12, September 1999**.
- St-Germain, Claude. *School Enrolments in Québec and the OECD Countries in 1995-96*, **No. 13, November 1999.**
- Lespérance, André, Pierre Ducharme and Diane Foucault. *Dropping Out of School*, **No. 14, March 2000**.
- Ouellette, Raymond. *School Administrators in Québec School Boards*, **No. 15, May 2000**.
- Demers, Marius. *Education pays!*, **No. 16, June 2000**.
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- Foucault, Diane. *Graduation Rates in Québec and the OECD Countries*, **No. 21, January 2001**.
- Lavigne, Jacques. *Forecast of Full-Time Equivalent Student Enrollment in Québec Universities, 2000-2001 to 2014-2015*, **No. 22, July 2001**.
- La Haye, Jacques. *Student Flow Indicators for Students Enrolled in Undergraduate Degree Programs at Québec Universities*, **No. 23, April 2002**.
- Lavigne, Jacques. *Forecast of Full-Time Equivalent Student Enrollment in Québec Universities, 2001-2002 to 2015-2016*, **No. 24, July 2002**.
- The concepts of permanent school leaving and dropping out, **No. 25, March 2003**.

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