

The Current Distribution of Educational Facilities within Urban Areas and Ways to Reorganize Them to Achieve Spatial Balance: A Case Study of the City of Biskra

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ABSTRACT

This study addresses the problem of the overall distribution of public facilities within urban space and the mechanisms for reorganizing them to achieve balance within the city. It starts from a clear discrepancy observed in the field between rapid urban expansion and intensive housing programs on one hand, and the school map on the other. The study aimed to identify the planning mechanisms capable of reorganizing this distribution to achieve balance in the allocation of facilities within the city, using the educational facilities of the city of Biskra as a case study.

Through field diagnosis and statistical and cartographic analysis using Geographic Information Systems, the study found a sharp gap between the reality of rapid urban expansion and intensive housing programs on one hand, and the rigidity of the school-map network on the other. This has resulted in a severe geographic maldistribution of pupils, leading to a numerical explosion and stifling overcrowding that exceeds acceptable standards in the secondary schools of the city center and the western sector, such as Mohamed Krouf and Mohamed Boudiaf secondary schools, which reached an occupancy rate of 42 pupils per class — in contrast to a clear waste of capacity and the presence of vacant rooms and classes in peripheral and developing secondary schools such as Obeid Allah, Ghemri Mohamed Fateh, and Hassani Abdelkrim, as a result of their weakness, isolation, and the lack of school transport networks.

To remedy this imbalance, the study proposed a set of urgent and structural solutions based on reorganizing the school map and adjusting intermediate catchment areas to direct pupils toward institutions with relatively comfortable capacity, strengthening urban and school transport to break the isolation of peripheral points, in addition to activating temporary pedagogical and organizational alternatives and applying a sub-grouping (splitting) system to reduce density within core classes — while stressing the necessity of digitalization and real-time

forward-looking coordination between the urban-planning and education sectors to ensure balanced and sustainable urban growth.

Keywords: Public facilities, spatial organization, urban balance, school overcrowding.

Introduction

One cannot speak of a balanced and stable urban space without referring to public facilities (Taleai et al., 2014; Chang & Liao, 2011, 2014), as they are the structuring element of the city and the essential pillar that provides vital services to citizens. Public facilities of various kinds (educational, health, administrative, and cultural) are not merely concrete blocks added to the urban fabric; rather, they are functional tools that help structure the city, chart the axes of its growth, and realize the concept of "social and spatial justice" by fairly meeting the needs of the population.

The city of Biskra is considered a living model for study and analysis, given its geographic specificity as a gateway to the Great South, and it has witnessed enormous fabric expansion in recent decades (**Bouzghaia, 2015**). Hence this research paper, entitled: "The Problem of Educational Facility Distribution within Urban Areas and Its Reorganization to Achieve Balance within Cities — A Case Study of the City of Biskra," aims to shed light on the reality of the educational-facility network, diagnose the points of imbalance and blockage between field supply and demand, and attempt to present a forward-looking vision and practical recommendations aimed at achieving sustainable and balanced urban development that restores Biskra's functional and spatial balance.

Public facilities, particularly educational and teaching services, are the essential pillar in the organization and structuring of urban areas (**Zepf & Bailleul, 2012**), since a sustainable and balanced city (**Wheeler, 2013**) cannot be conceived without a fair and logical distribution of these facilities. Today, Algerian cities in general, and the city of Biskra in particular, face considerable challenges arising from rapid urban expansion and accelerated demographic growth, which has led to the emergence of clear spatial gaps between supply and demand.

The city of Biskra faces a major paradox between an abundance of supervisory staff and human resources on one hand, and severe overcrowding within teaching classes on the other — particularly in the secondary stage, which is approaching the "red line," with occupancy rates exceeding 37 to 42 pupils per class in some institutions such as Mohamed Krouf and Mohamed Boudiaf secondary schools, compared to unused capacity and declining accessibility in other secondary schools such as Ghemri Mohamed Fateh (**field investigations in educational institutions**). From here, the study raises the following main question:

How does the reorganization and relocation of educational facilities contribute to achieving balance within the city of Biskra? Accordingly:

What is the actual state of the distribution of educational facilities (secondary stage) in the city of Biskra, and what are the dimensions of the gap between field supply and demand? What planning mechanisms and solutions are possible for reorganizing the network of these educational facilities in a way that ensures breaking the urban isolation of some educational institutions and achieves spatial balance?

1. Conceptual Framework

1.1. The City

The city is a set of designs built on mathematical, geometric, philosophical-ideological, and symbolic configurations (**Critchlow & Keith, 1999**), and it is an expression of the evolution of architectural art, which has, over the ages, tried to highlight the aesthetics that attract people and the grandeur that expresses the authority and power of rulers (**Sudjic, 2005**). The city is a geographic space and the largest, non-homogeneous population cluster living on a relatively limited piece of land (**Marchal & Stébé, 2023**), providing its inhabitants with better social and economic living conditions, which makes it a pole of attraction characterized by strong political construction and by the specialization and multiplicity of services. It can be said that the city is a set of social structures, each distinguished from the other for reasons imposed by the nature of the urban environment; some researchers go so far as to say that the city is the wellspring of opinion and thought and a unit that produces a culture with its own social relations, rules, norms, and values, and a distinctive model of organization and development (**Khalfallah, 2005, p. 76**).

E. Durkheim defined the city as a space that allows the growth of moral consciousness, and the geographic unit within which organic solidarity is achieved, leading to greater freedom and prosperity — this following his dual classification between a first type of society dominated by mechanical solidarity and another dominated by organic solidarity. In addition, many thinkers have taken up this dual classification in order to distinguish between urban and rural society, such as Ibn Khaldun (Bedouin ‘umran and urban ‘umran), Maine (a status-based society versus a contract-based society), Tönnies (Gemeinschaft, community based on natural will, versus Gesellschaft, society based on rational will), and Redfield (folk society versus urban society) (**Soualmia, 2018, p. 100**).

In the general sense, a city is anything that includes the following elements (Habib, 1990, p. 64):

- City center: the main services area, containing the activities and living requirements that serve the city.
- Residential area: the various types of residential neighborhoods and districts.
- Transport network: roads of all kinds and railways.
- Public services: represented by public facilities that provide services to the population, such as hospitals, schools, and administration...
- Industrial zone: contains factories and large workshops.
- Green and open spaces: includes parks and playing fields.

As for the 2008 census, it adopted basic criteria for defining the concept of a city, namely (Armature Urbaine, 2011, pp. 36–37):

- Minimum population estimated at 5,000 inhabitants.
- Economic activity: fewer than 25% engaged in agricultural activity.
- Basic conditions: the provision of a water, electricity, and sanitation network (réseau d'assainissement).
- Complementary conditions: the presence of a hospital or a multi-service clinic (polyclinique), a secondary school or middle-education institution, the presence of socio-

cultural facilities such as youth centers, recreational sports facilities, as well as administrative facilities (post offices, a court, etc.).

Accordingly, a city is any area whose population reaches 5,000 inhabitants or more, which has all the necessary facilities and equipment, and in which 75% of the inhabitants engage in activities other than agriculture, in addition to engaging in industrial activities.

1.2. Public Facilities

Public facilities respond to a basic objective, which is public service; they also meet all the needs of citizens free of charge, make no distinction between members of society, and are not aimed at making a profit through the provision of this service.

Public facilities are linked to public funds, and the process of their realization is carried out by political managers, technicians, and specialists in the field; their social and urban impact has an important character on the dynamic side, and the decision must be taken in coordination among the various bodies in the city. For most inhabitants, facilities are considered the basis of activity within the city; moreover, facilities are not confined to a neighborhood-level or city-level scale, as today many facilities have different — sometimes overlapping and complementary — functions.

2. Financing Mechanism for the Completion of Public Facilities

Programs are carried out based on a request from the relevant sectors, whereby the Directorate of Public Facilities (DEP) prepares a financial estimate of the value of facilities in each sector (**Executive Decree No. 13-13, 2013**) and submits a report on this to the Secretary General of the Province (Wilaya). On this basis, the financial amounts allocated to each sector are determined, and the financing decision is then issued in line with what is set by the Central Committee of each province (**Telaidjia, 2016**). After that comes the role of the Municipal People's Assemblies and the municipal accountant, where deliberations are held for the final approval of the list of projects along with the financial amounts allocated to them, within the framework of the Municipal Development Plan.

These projects are financed through annual expenditures distributed among the various economic sectors, in line with the schedule proposed by the province's Executive Council. The funds are then disbursed by the Ministry of Finance and sent to each province at the beginning of each year, before January 21 (**MFDGB, 2011**), which leads to the decisions concerning the financing of the projects making up the municipal plan. Accordingly, the municipality or the province is required to reconsider matters through the financial evaluation of projects carried out by the Ministry of Planning, which may lead to delays in completion; facilities can therefore be assessed according to sector, impact, and the budget granted to each sector. Facilities of local scope, which fall under the Sectoral Development Plan (**PSD**), include: schools, markets, and playing fields, etc.

As for facilities of regional scope, these fall under the decentralized programs of the facility sectors; the program is notified by decision, whereby program authorizations are distributed by the Minister of Finance in the form of partial sectors, their content including annexes (**Executive Decree No. 98-227, 1998**). Facilities of national scope and high cost, on the

other hand, are those financed directly by the State and fall under the national plan, where measures relating to equipment for the competent administrations and financially autonomous, centrally managed institutions (PGC) are taken by the Minister of Finance (**Beneddine, 2021**).

3. Organization of the Education Sector in Algeria

The educational system in Algeria is made up of different sub-systems falling under the supervision of three different ministerial departments: the Ministry of Higher Education, the Ministry of Vocational Training, and the Ministry of National Education — the latter being responsible for primary and middle education, in addition to secondary education.

3.1. Educational Facilities by Educational Level

The educational facilities of this ministry vary according to each educational level, as follows:

a- Primary Education

It is divided into four categories, which differ according to the number of classrooms, the number of pupils, and the land area, as shown in the following table:

Table No. (1): Categories of Primary Schools

Category	No. of classrooms	No. of pupils	Built area (m ²)	Vacant area (m ²)	Land area (m ²)	Capacity
A	3	36	553	900	1453	108
B	6	36	1003	1500	2503	216
C	9	36	1474	1500	2974	324
D	12	36	1896	1500	3396	432

Source: Theoretical Network of Facility Provision, 1995

- The distance between the school and the child's home must not exceed 400 m.

- A, B, C, D represent institution sizes according to the number of rooms.

b- Middle Education

Table No. (2): Middle-Education Institutions According to the Theoretical Facility Network

Category	No. of pupils	Built area (m ²)	Vacant area (m ²)	Land area (m ²)
Base 03	324	1437	1532	2960
Base 04	432	1738	1142	2880
Base 05	540	1965	1634	3600
Base 06	648	2332	1998	4320
Base 07	826	2687	2353	5040

Source: Theoretical Network of Facility Provision, 1995

c- Secondary Education

Two secondary schools are built for every 33,000 inhabitants, with a unit area estimated at 44,000 m², giving a per-capita share of 0.66 m²/inhabitant.

One technical/polytechnic institute ("métqana") is built for every 100,000 inhabitants, with a unit area estimated at 25,000 m², giving a per-capita share of 0.25 m²/inhabitant.

3.2. Legislative and Regulatory Texts***a- Classroom Occupancy Standards***

Algerian educational laws and regulations set specific standards for classroom occupancy rates, in order to ensure the quality of teaching and academic achievement. These standards are based primarily on Ministerial Decision No. 25 of October 4, 2011, in addition to the annual circulars relating to preparation for the start of the school year.

The following is a breakdown of classroom occupancy rates (number of pupils per teaching group):

- 1- The standard (model) average: according to the guiding plans of the Ministry of National Education, the rate the State seeks to achieve is 25 to 32 pupils maximum per classroom.

The legal maximum: in exceptional cases or areas experiencing population pressure, this rate is raised, but the law sets red lines:

- 2- Maximum limit: must not exceed 40 pupils per classroom.
- 3- This rate aims to allow the teacher to apply the "competency-based approach," which requires individual follow-up of each pupil.
- 4- Occupancy rate by educational stage: the organizational vision differs slightly by stage:
 - Primary stage: the focus is on not exceeding 32 pupils, especially in the first-year primary class, to ensure the learning of reading and writing.
 - Secondary stage: given the nature of scientific and technical subjects (practical/laboratory work), the teaching group is sometimes divided into smaller groups (half-groups) ranging between 15 and 17 pupils inside laboratories.

b- Average Supervision Ratio in Algerian Law

In Algerian law and the applicable school regulations, particularly Decision No. 135, which defines teachers' duties as well as school-map guidelines, a teacher's "capacity" is not determined solely by the number of classes, but is set through the weekly hourly quota and classroom density.

c- Hourly Quota (Legal Teaching Load)

The law sets the number of weekly teaching hours for each stage, which is the basic criterion for the distribution of classes:

- Primary education: 27 hours per week (usually one fixed class).
- Middle education: 22 hours per week.
- Secondary education: 18 hours per week.

If a teacher exceeds this quota (through additional hours), the psychological pressure indicator begins to rise, which affects the quality of pedagogical performance.

d- Teaching Capacity

From a pedagogical standpoint, a teacher's capacity depends on the total number of pupils he or she follows (Mass Horaire — total teaching-hour load), and the unwritten rule in Algerian educational organization aims for:

- In core subjects such as mathematics, Arabic, and physics: the teacher teaches between 3 and 4 classes at most, in middle and secondary education, to fulfill his quota.
- In subjects with a small hourly volume, such as history and geography or, sometimes, foreign languages: the teacher may have to teach 6 to 8 classes to reach his legal hours.

** The problem: pressure does not come only from the number of hours, but from the number of "school notebooks" and "papers to grade." A teacher teaching 8 classes — around 300 pupils — is subject to pressure far exceeding that of a teacher teaching 3 classes with the same hourly load.*

e- Classroom Density

Based on the standards of the Ministry of National Education to avoid overcrowding: the targeted national average is 30 pupils per classroom.

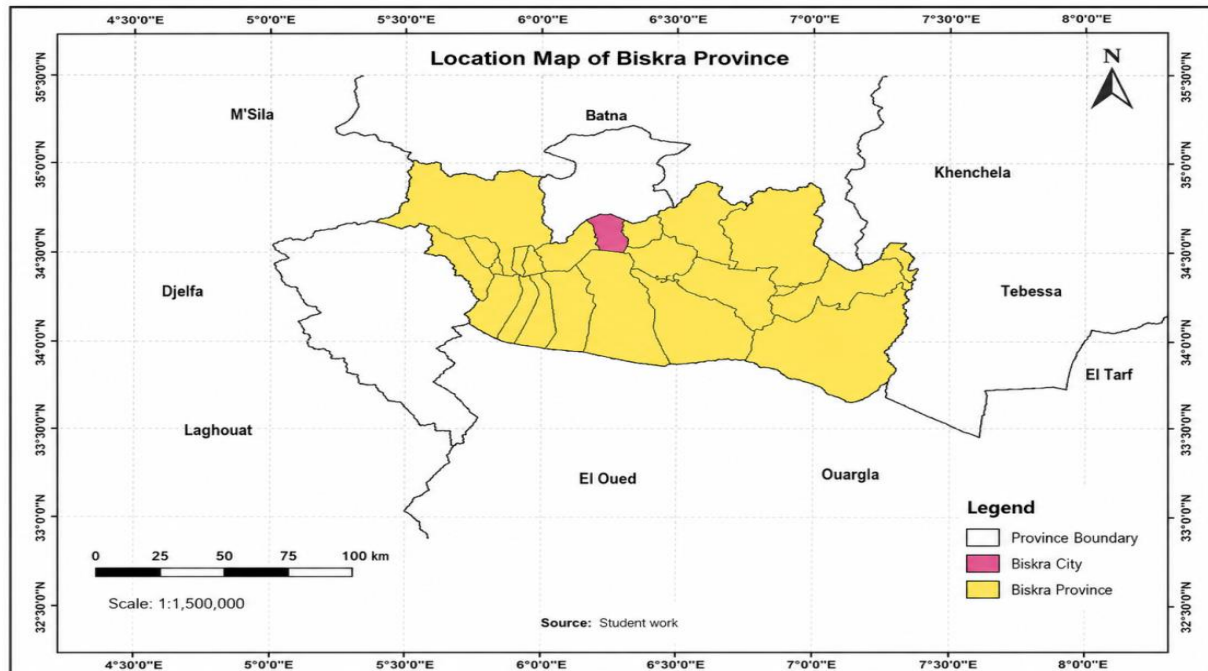
4. Definition of the Study Area

The municipality of Biskra is located in the northeastern Algerian Sahara, specifically at the foot of the Aurès massif and the Zibans mountains (**Bouzahzah, 2015**), and is crossed by Wadi Sidi Zerzour, between longitudes 5 and 6 degrees east of Greenwich and between latitudes 34 and 35 degrees north of the equator (**Ihaddadene et al., 2023**). The total population of Biskra Province was estimated, according to end-of-2024 estimates, at 804,736 inhabitants (**ONS, 2024**), with an annual growth rate of 2.30%, while the population density is 78.54 inhabitants/km².

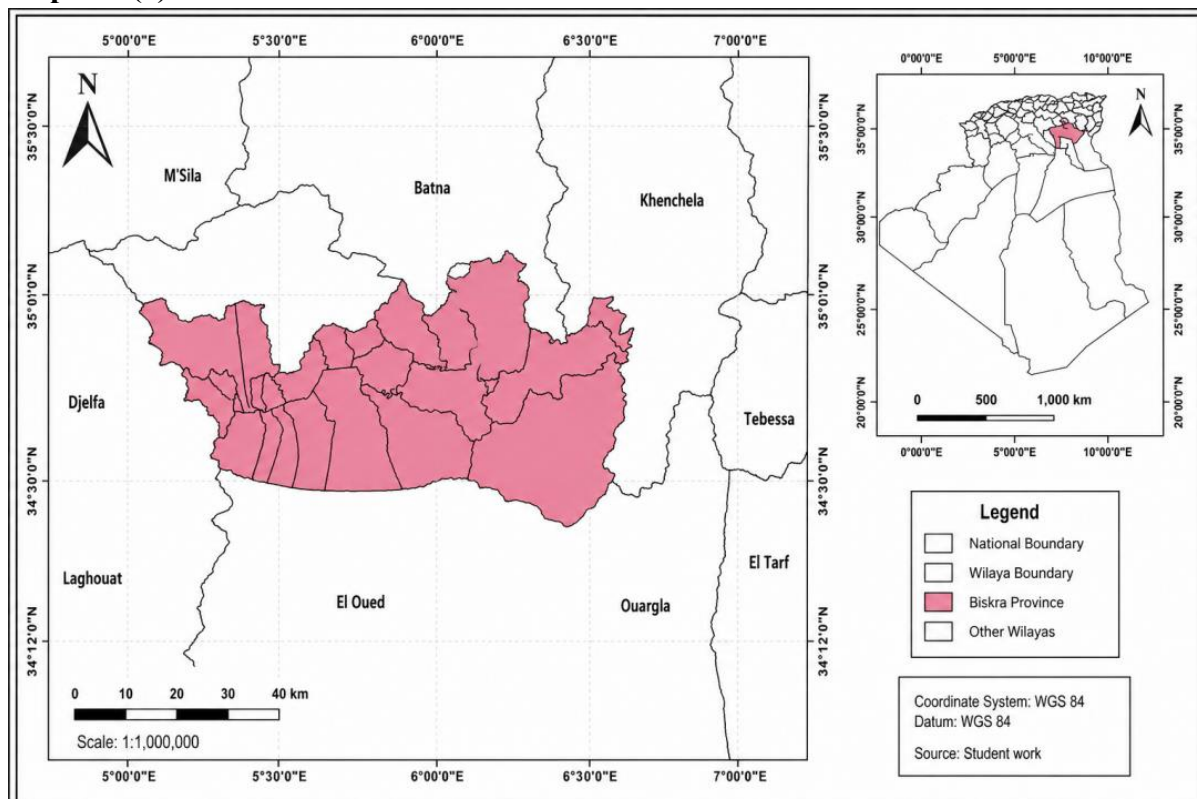
It is nicknamed "the Bride of the Zibans" and "the Gateway to the Desert," and it also occupies a strategic position as the first Saharan urban pole. Its area is 127.55 km², and it lies at an altitude of 120 m above sea level. Biskra is characterized by a dry desert climate, with an average temperature of 24°C and rainfall estimated at 72 mm (**Seltzer, 1946; Aidaoui, 1994**), and humidity ranging between 18% and 46% for the year 2024 (**ONM Biskra, 2024**).

The municipality of Biskra is the provincial capital and the seat of the district (daïra). The province comprises 10 districts and 27 municipalities, following the establishment of Ouled Djellal as an independent province. It is bordered to the north by the municipalities of Loutaya and Branis, to the east by the municipalities of Chetma and Sidi Okba, to the south by the municipality of Oumache, and to the west by the municipality of El Hadjeb (see Map No. 1).

Map No. (1): Location of Biskra Province and Municipality



Map No. (2): Administrative Division of Biskra Province



5. Educational Facilities of Biskra Municipality by Educational Level

5.1. Primary Education

The number of educational institutions in Biskra Province at this stage is 316, containing 2,965 classrooms in use, while the number of pupils is 98,543, of whom 48,280 are female (**Biskra Provincial Directorate of Education, 2024**), i.e., a rate of 48.99%.

The classroom occupancy rate at this stage equals 33 pupils per classroom, varying from one municipality to another; pupils are distributed across 3,415 teaching groups, with an average of 29 pupils per group. The number of teachers is 4,352, i.e., a ratio of 22 pupils per teacher.

As for the number of school canteens for the 2023–2024 school year, it is estimated at 213 school canteens, with a capacity of 36,737 meals and a number of beneficiaries estimated at 67,376.

5.2. Middle Education

The number of middle schools in Biskra Province is estimated at 123 institutions, containing 1,866 classrooms in use, with a total of 67,450 pupils, of whom 32,761 are female, i.e., a rate of 48.57%. The classroom occupancy rate equals 36 pupils per classroom; the number of teachers reaches 3,504, i.e., a ratio of 19 pupils per teacher.

5.3. Secondary Education

The total number of institutions is 52 secondary schools in Biskra Province, containing 877 classrooms in use, while the number of pupils at this stage is 29,526, of whom 17,313 are female, i.e., a rate of 58.64%. The classroom occupancy rate equals 34 pupils per classroom, while the number of teachers reaches 2,083, i.e., a ratio of 16 pupils per teacher.

Photo No. (3): Si El Haouas Martyr Secondary School

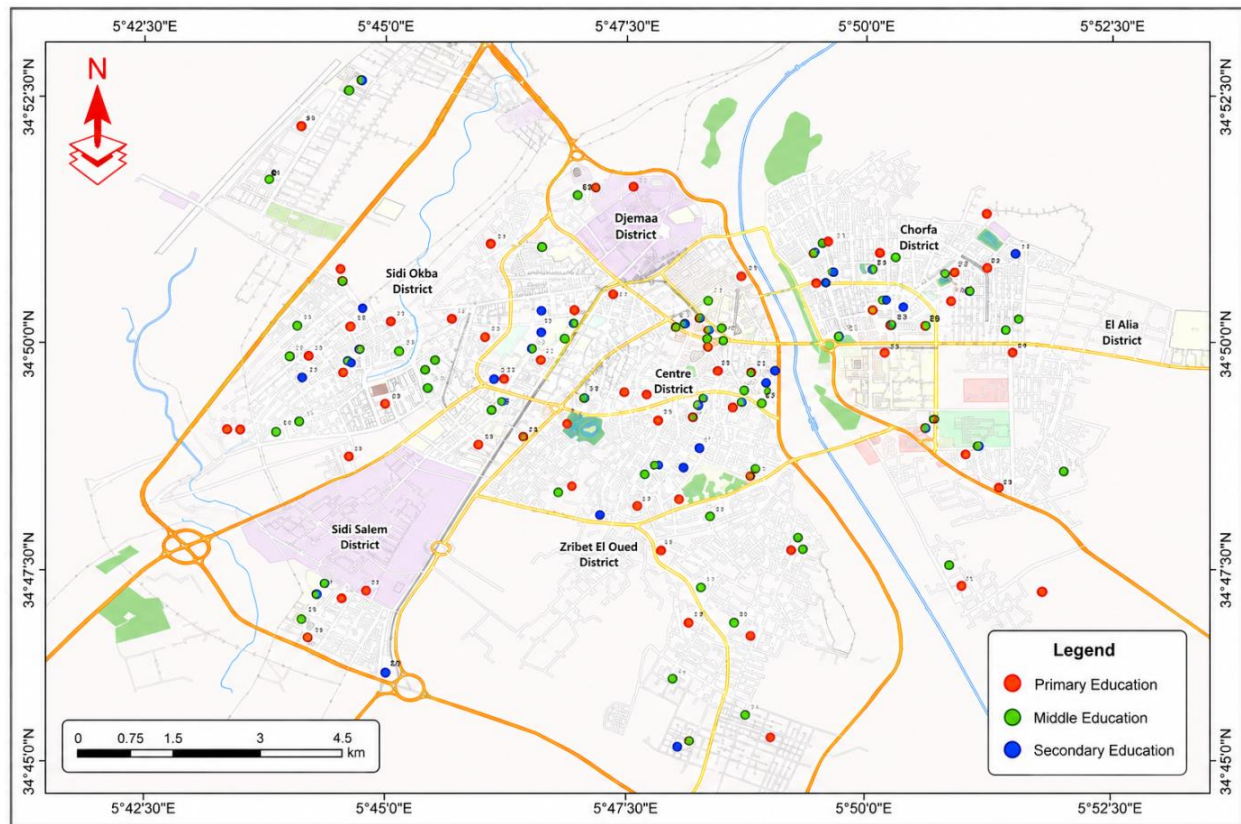
6. Distribution of the Number of Educational Institutions

To find out how the schools of the city of Biskra are distributed across the various educational stages (see Map No. 3), we present the following illustrative table:

Table No. (3): Distribution of the Number of Educational Institutions in Biskra Municipality

Stage	Primary Education	Middle Education	Secondary Education
No. of educational institutions	103	47	18

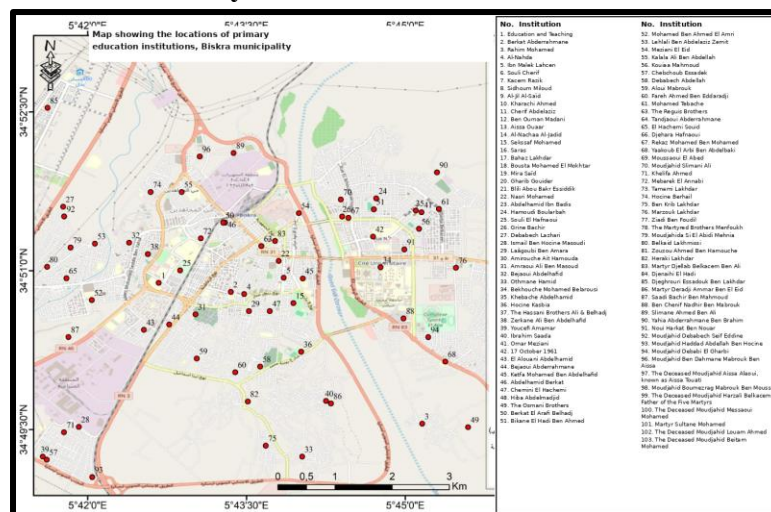
Source: Directorate of Education, academic year 2025–2026

Map No. (3): Locations of Educational Institutions in Biskra Municipality

The above table reflects the organizational structure of the national education sector with respect to the distribution of the number of educational institutions at the local level (Biskra municipality), and provides numerical indicators that can be analyzed according to three parts:

6.1. Primary Education

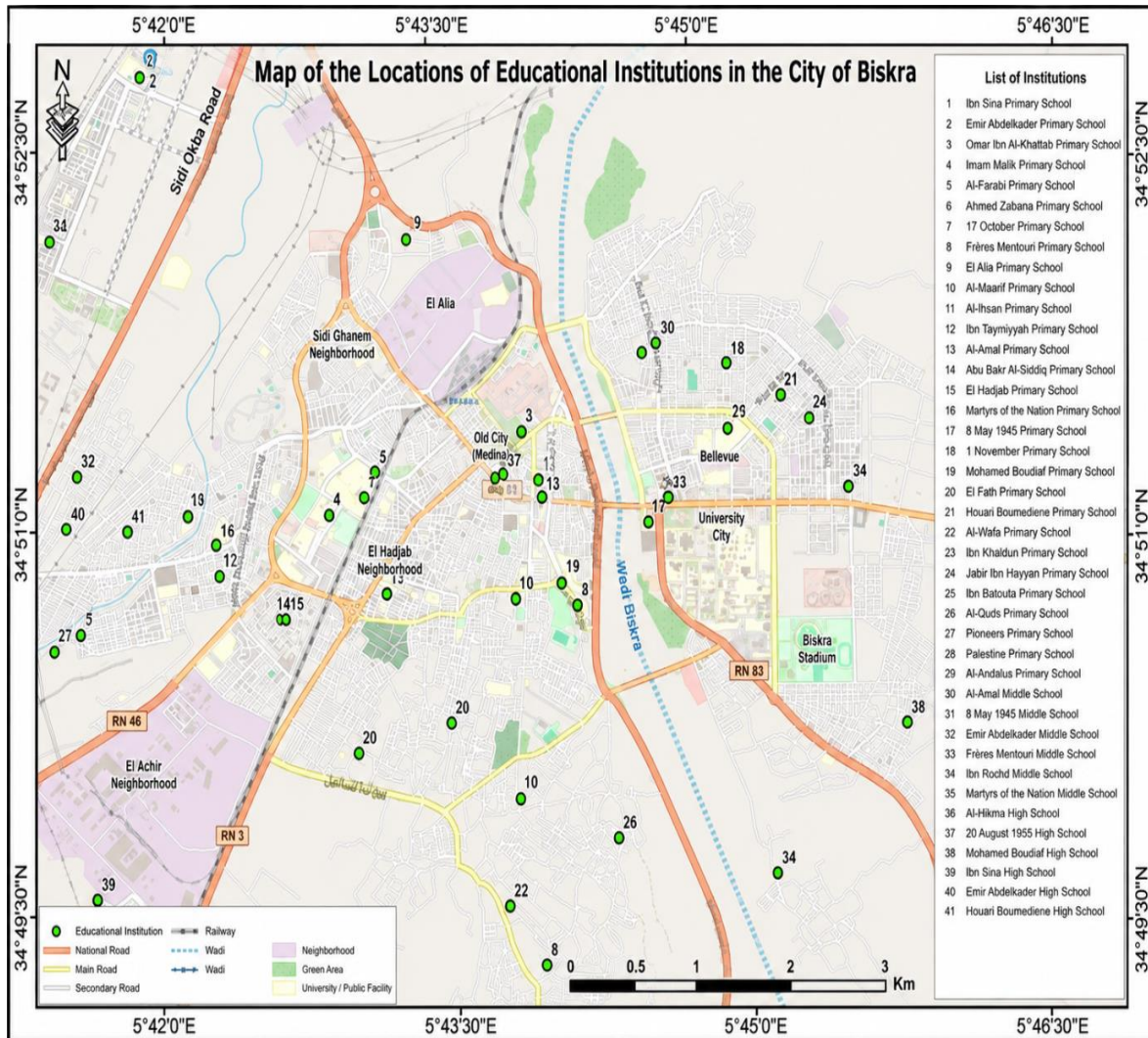
It represents 103 institutions out of the total number of institutions; this quantitative expansion reflects the policy of universal schooling.

Map No. (4): Locations of Primary Education Institutions in Biskra Municipality

6.2. Middle Education

It comprises 47 institutions; we note here a large numerical drop compared with primary education, and accordingly, graduates of several primary schools are gathered into a single middle school. It therefore becomes necessary to provide a school in every residential neighborhood to ensure geographic proximity (see Map No. 5).

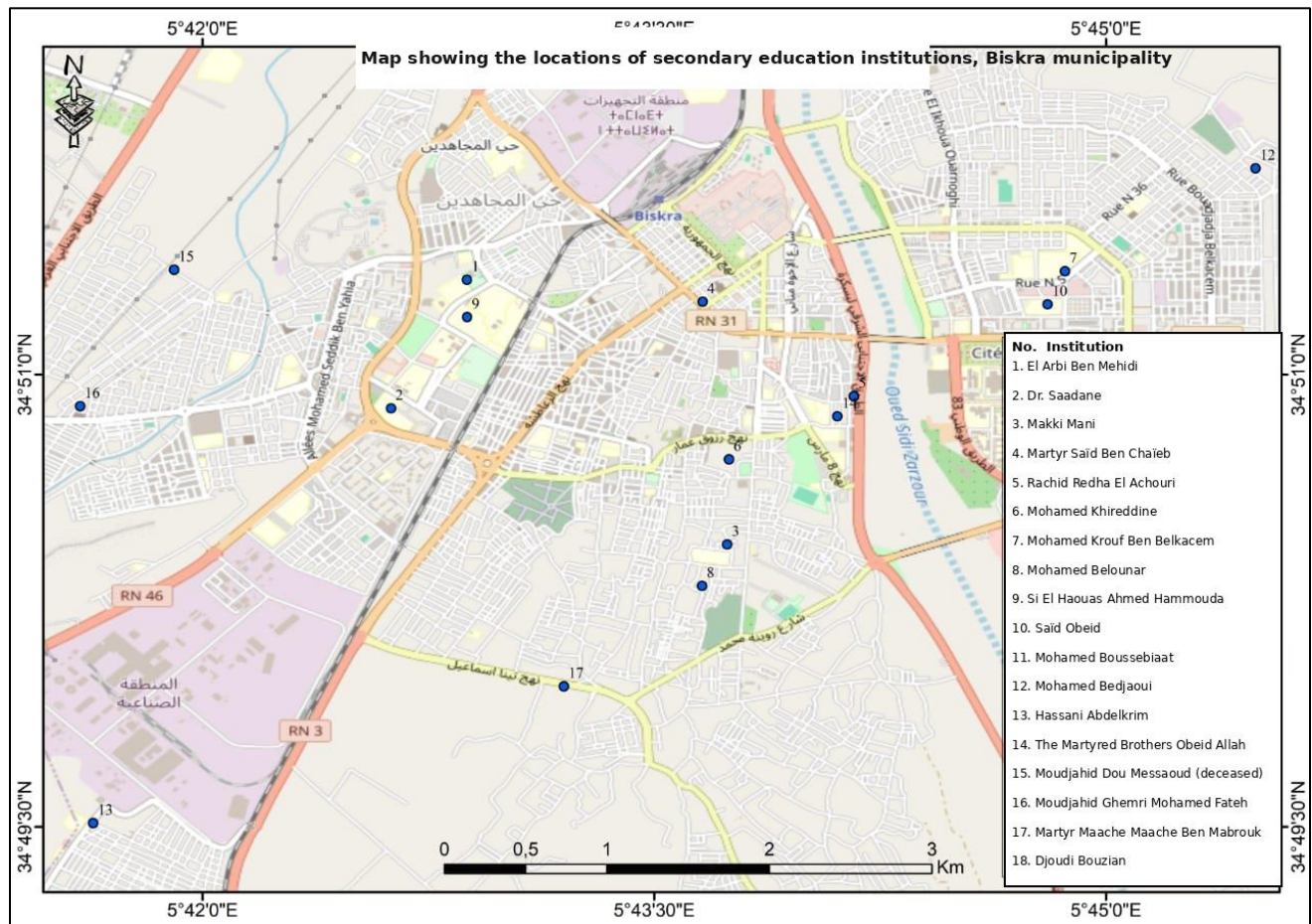
Map No. (5): Locations of Middle Education Institutions



6.3. Secondary Education

It is represented by only 18 institutions (see Map No. 6); this numerical contraction reflects the nature of secondary education as a specialized form of education requiring material resources.

The primary/middle ratio is determined by the presence of one middle school for approximately every 2.28 primary schools, while the middle/secondary ratio is determined by the presence of one secondary school for approximately every 2.61 middle schools. Statistically, this means that each middle school in Biskra is required to absorb the graduates of roughly two and a half primary schools, and each secondary school is required to absorb the graduates of roughly two and a half middle schools, as a general average.

Map No. (6): Locations of Secondary Education Institutions, Biskra Municipality

Through the analysis of the distribution of the number of educational institutions in Biskra municipality, it appears that 18 secondary schools in a single municipality (Biskra) reflects the city's role as an administrative and educational center, as these secondary schools often serve not only the inhabitants of the municipality but even residents of the nearby suburbs.

The high density of primary schools (103 schools) indicates extensive consumption of urban land within the neighborhoods, while the small number of secondary schools (18) indicates that the choice of their locations is governed by criteria of "catchment/attraction" and ease of access via the urban transport network. If we compare these numbers with the population density of the city of Biskra, any future demographic growth will show its effect first in "overcrowding" within the 103 primary schools, before moving as a "shock wave" to the other educational stages within the following 5 to 10 years.

From this we conclude that Biskra municipality suffers from a numerical imbalance between educational stages, which results in:

- Tremendous pressure on the 18 secondary institutions.
- The existence of only 18 secondary schools against 47 middle schools indicates a potential shortage of pedagogical seats for secondary education in the medium term, because the secondary stage requires specializations (sciences, technical, humanities),

and distributing 18 institutions across a municipality the size of Biskra may cause some pupils to face geographic distance, which contradicts the principle of proximity of public facilities.

- The figures suggest that Biskra municipality suffers from pedagogical pressure at the middle and secondary stages, as a result of urban expansion that focused on building primary school complexes (whose construction falls under the municipality) as against delays in completing secondary and middle schools (whose construction falls under the Directorate of Public Facilities).
- Difficulty in controlling the school map so as to keep the classroom occupancy rate below the threshold of 40 pupils.

7. Classroom Occupancy Rate by Stage

Table No. (4): Classroom Occupancy Rate

Stage	No. of pupils	No. of classrooms	Occupancy rate
Primary education	35,411	1,067	33
Middle education	25,210	704	35
Secondary education	12,809	342	37

Source: Directorate of Education, 2025–2026

Based on the data presented in Table (3) concerning the number of pupils, the number of classrooms, and the classroom occupancy rate in Biskra municipality — which explains the relationship between the number of pupils and the physical infrastructure represented by classrooms — we observe a major numerical paradox: the higher the educational stage, the higher the classroom occupancy rate. This confirms that the real shortage is concentrated in the secondary stage. While primary education enjoys relative flexibility (33 pupils/classroom), the secondary stage approaches the legal "red line" (37 pupils/classroom), noting that there are cases that may exceed 40 pupils in high-density areas. We also note that the number of classrooms in secondary education (342 classrooms) is very small compared with primary education (1,067 classrooms).

The secondary stage includes 12,809 pupils, and at a rate of 37 pupils per classroom, the pedagogical process — especially in scientific subjects and languages — becomes extremely difficult. This pressure reduces the quality of academic achievement and leads to rapid wear of facilities. The table also shows that there are 35,411 pupils in primary education who will later flow toward only 704 classrooms in middle education, then toward 342 classrooms in secondary education. We are facing a serious problem in terms of overcrowding: the current infrastructure in the middle and secondary stages will not be able to absorb the natural increase coming from primary education if the rate of construction of new classrooms continues at this pace, and pressure on secondary schools will increase considerably.

From here we conclude that:

- The sector suffers from an infrastructure deficit: there is a clear shortage in the number of classrooms allocated to secondary education in Biskra municipality compared with the high demand.
- A rate of 37 pupils per secondary classroom constitutes pedagogical pressure on both the institution and the teacher, and makes the application of modern teaching standards difficult.
- It appears that investment in classrooms focused on quantity at the primary level, while the balance required at the secondary level was neglected, creating a situation approaching saturation in secondary schools.
- Biskra municipality suffers from acute pressure at the secondary and middle stages, with signs of an
- emerging shortage of pedagogical seats.

8. Supervision Ratio by Stage

Based on the legal pedagogical standards, we will now examine supervision at the level of Biskra municipality.

Table No. (5): Supervision Ratio

Stage	No. of teachers	Classroom occupancy rate	Supervision ratio
Primary education	1,507	33	23
Middle education	1,320	35	19
Secondary education	865	37	15

Source: Directorate of Education, 2025–2026

Through the data in Table (5) concerning the supervision ratio relative to the number of teachers and the classroom occupancy rate, we note that in the primary stage the supervision ratio is 23 pupils per teacher, and the classroom occupancy rate is 33 pupils/classroom.

As for the middle and secondary stages, we find the lowest supervision ratio at 15 pupils per teacher, but in contrast we find the highest classroom occupancy rate (37 pupils/classroom). Legally, providing one teacher for every 15 pupils is an indicator of educational prosperity, but the reality is that these pupils are packed into classrooms holding 37 individuals. This means that a teacher in Biskra may teach fewer hours than his legal quota because of the teacher-recruitment policy adopted, but when he does teach, he faces severe overcrowding. From this we conclude that:

- A teacher in Biskra may teach fewer hours than his legal quota because of the recruitment policy adopted, but when he does teach, he faces severe overcrowding. The problem, therefore, is not a shortage of teachers but a shortage of educational infrastructure and facilities, which negatively affects the quality of pedagogical supervision.
- Algerian law aims to reach 25–32 pupils per classroom. Reaching a number of 37 in secondary education means:

- Difficulty in controlling the classroom, which generates psychological pressure on the teacher.
- The impossibility of applying modern teaching methods that rely on group work.
- Exhaustion of the teacher in grading and assessment processes, which may lead to "professional burnout" despite the small number of hours.
- The existence of a low supervision ratio (15 pupils/teacher) alongside overcrowded classrooms indicates poor use of human resources, as there is a surplus of teachers who cannot find classrooms in which to carry out their duties comfortably and in sound pedagogical conditions.

From this we conclude that the fundamental problem in Biskra municipality lies in the fact that the teacher is subject to pressure resulting from the density of a single classroom, not from the number of classes or hours.

9. Solutions and Proposals for the Problem of Shortage in Educational Facilities

Given the shortage suffered by secondary education compared with the other stages, we decided to focus our set of proposals on this level. We therefore turn to the following table, which shows the educational indicators, occupancy levels, and capacity in the secondary schools of Biskra municipality:

Table No. (6): Human and Structural Indicators for the Secondary Stage, Biskra Municipality

No.	Institution	Address	Pupils	Teachers	Classes	Used	Occ. rate	Supervision
01	El Arbi Ben Mehidi	Hai Beni Mora	932	77	30	30	31	12
02	Dr. Saadane	Route de Tolga	942	58	29	26	36	16
03	Makki Mani	Hai Zemam Rass El Qaria	647	52	20	20	32	12
04	Martyr Saïd Ben Chaïeb	Hai El Moudjahidine, Route de Batna	1163	80	29	29	40	14
05	Rachid Redha El Achouri	Harat El Oued	579	45	14	14	41	12
06	Mohamed Khireddine	Rue El Hakim Saadane, Hai Ezzouaka	535	44	15	15	35	12
07	Mohamed Krouf Ben Belkacem	Hai El Idari El Aliya	1680	91	40	40	42	18
08	Mohamed	Hai Ras El Qaria	724	63	22	22	32	11

No.	Institution	Address	Pupils	Teachers	Classes	Used	Occ. rate	Supervision
	Belounar							
09	Si El Haouas Ahmed Hammouda	Hai Beni Mora, Biskra	674	45	17	17	39	14
10	Saïd Obeid	Hai El Aliya	831	60	20	20	41	13
11	Mohamed Boussebiaat	Hai El Amal, Western Zone	927	64	22	22	42	14
12	Mohamed Bedjaoui	Eastern Aliya	616	55	19	19	32	11
13	Hassani Abdelkrim	Hai Sidi Ghezal	505	38	18	18	28	13
14	The Martyred Brothers Obeid Allah	P.O. Box 433, Route de Sidi Okba	360	38	18	13	27	9
15	Moudjahid Dou Messaoud (deceased)	Western Zone	641	41	16	16	40	15
16	Moudjahid Ghemri Mohamed Fateh	Hai 1460 Logements (municipal rental), Biskra	352	37	25	15	23	9
17	Martyr Maache Maache Ben Mabrouk	Old Biskra, Bordj Ettork Gaddacha, Biskra	489	40	14	14	34	12

Source: Directorate of Education, 2025–2026

The classroom occupancy rate is considered the most important indicator for assessing the quality of the educational environment; through Table (6) we observe three levels of pressure:

9.1. High-Pressure Zones

These include more than 40 pupils per classroom, represented by:

- Mohamed Krouf Ben Belkacem Secondary School: records the highest pupil count at 1,680 pupils and an occupancy rate of 42.

- Mohamed Boudiaf Secondary School: tied for the highest occupancy rate at 42 pupils per classroom, despite having fewer pupils (927), which indicates an acute shortage in the number of available classrooms — only 22 classrooms.
- Rachid Redha and Saïd Obeid secondary schools: recorded a rate of 41.
- Martyr Saïd Ben Chaïeb Secondary School: recorded a rate of 40, with a huge pupil count estimated at 1,163.

9.2. Medium-Pressure Zones

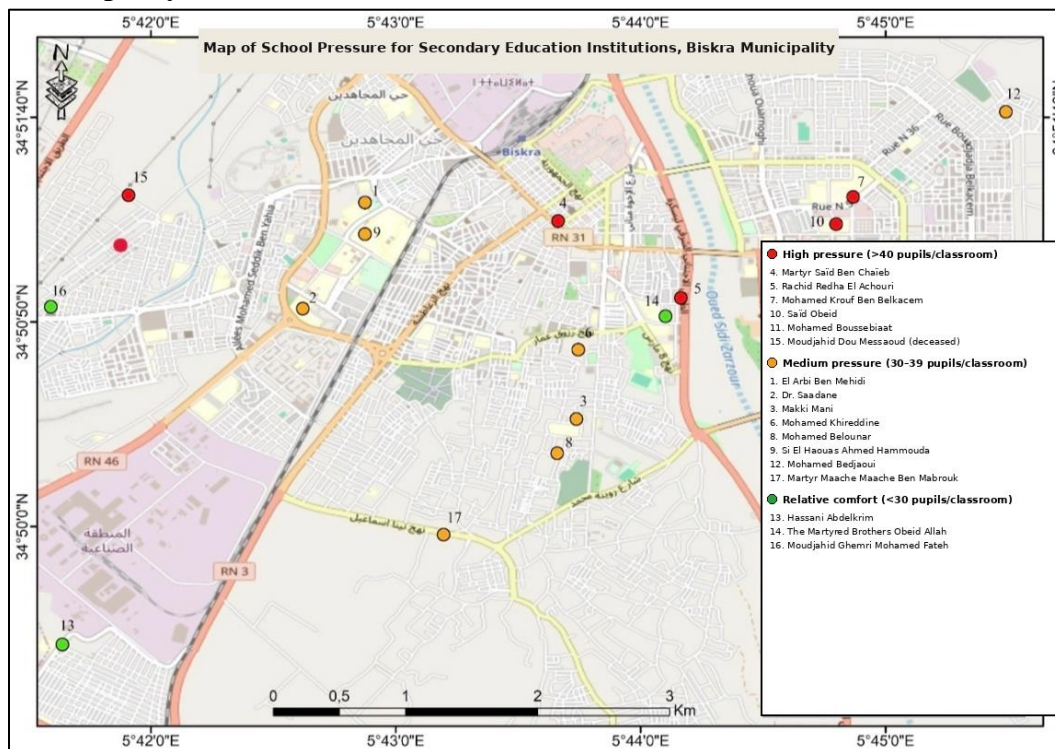
These include between 30 and 39 pupils/classroom and comprise most of the municipality's secondary schools, such as El Arbi Ben Mehidi, Dr. Saadane, and Makki Mani, which are approaching the edge of overcrowding.

9.3. Zones of Relative Comfort

These include fewer than 30 pupils/classroom:

- Moudjahid Ghemri Mohamed Fateh Secondary School stands out with the lowest occupancy rate, at 23 pupils/classroom; it is noted that it has a surplus of classrooms — 25 available, of which only 15 are used.
- It is followed by Hassani Abdelkrim Secondary School, with a rate of 28.

Map No. (7): School Pressure Zones for Secondary Education Institutions, Biskra Municipality



The data also show important discrepancies in how buildings are utilized:

- Most of the overcrowded secondary schools use 100% of their available classrooms — such as Mohamed Krouf, El Arbi Ben Mehidi, and Mohamed Boudiaf — which means there is no flexibility whatsoever for internal expansion.

- The Martyred Brothers Obeid Secondary School: has 18 classrooms and uses only 13, with an occupancy rate of 27.
- Moudjahid Ghemri Secondary School: has 25 classrooms and uses only 15.
- Dr. Saadane Secondary School: has 29 classrooms and uses 26.

9.3.1. Supervisory Efficiency

The statistics indicate that supervision ratios are positive and mostly range between 9 and 18 pupils per teacher, which are considered generally good levels; they also show a direct relationship with density, as we note that the highest supervision ratio is found at Mohamed Krouf Ben Belkacem Secondary School — the very same school that suffers the highest classroom occupancy rate.

From this data we conclude:

- There is a poor distribution of pupils across the municipal map: while the secondary schools of "El Aliya," the "Western Zone," and the "Administrative District" suffer from a numerical explosion, we find a surplus of unused classrooms in other neighborhoods, such as the 1460-Housing-Unit district.
- Mohamed Krouf Belkacem Secondary School represents a major urban and pedagogical weight, with 1,680 pupils — a number exceeding comfortable supervision capacity — which makes it a top priority in any expansion or relief project.

9.3.2. The Relationship between Supervision and Overcrowding

We note that the high-pressure secondary schools have a large number of teachers — 91 teachers at Mohamed Krouf, 80 at Saïd Ben Chaïeb — but the problem lies in the number of classrooms, not in human resources.

- The absence of flexibility in the school map, and the failure of school-transport lines and pupil-direction policies to keep pace with urban expansion, have made the secondary schools close to the center or to the major residential axes completely saturated, while peripheral or less accessible secondary schools are partly deserted.
- High-pressure institutions have reached a point where any future demographic increase in those neighborhoods will lead to a complete collapse of their pedagogical system, while current planning tools such as the PDAU (Master Plan for Development and Urban Planning) and the POS (Land-Use Plan) treat these figures as static statistics rather than as a dynamic spatial phenomenon.

9.3.3. Proposals by Category

Starting from the principle of regional balance and addressing the gap between the lived reality of educational facilities and the aspirations of the city of Biskra's Master Plan for Development and Urban Planning (PDAU), the challenge no longer lies so much in providing new facilities as in the efficient management of available spaces. By projecting the pressure and overcrowding indicators onto the municipality's school map, we summarize below a set of corrective and innovative solutions, classified by geographic category and the nature of the problems of each secondary school:

Table No. (7): High-Pressure Category

Secondary School	Problems	Proposals
Mohamed Krouf Ben Belkacem Secondary School Saïd Obeid Secondary School	Both are located in Hai El Aliya, a demographic center of gravity and central catchment point for several feeder areas. Surrounded by the administrative district and by both high-rise and sprawling residential neighborhoods. A record classroom occupancy rate of 42 pupils per classroom — total utilization of school facilities.	Set up a GIS-based system that prevents any automatic assignment to the school. Relieve pressure on teaching and support facilities. Adopt a group-splitting (sub-grouping) system to reduce density. Use the vacant lot available at the secondary school, converting it into a building that can be divided into classrooms.
Rachid Redha El Achouri Secondary School	Serves working-class neighborhoods such as Hai El Mahatta (Station District) and Harat El Oued. Rapid local demographic growth not matched by expansion of the school's capacity infrastructure.	Since the school has a two-story structure with no horizontal space available, redesign the wings to add an upper floor using light, prefabricated steel structures that do not burden the old building's foundations. Repurpose vacant interior space — storage rooms and wide corridors — into flexible teaching rooms used as needed.
Moudjahid Dou Messaoud Secondary School Mohamed Boussebiaat Secondary School	Located in the western part of Biskra municipality, an area of rapid urban growth where individual housing has been converted into collective housing, doubling the population without expanding the school network. Both schools act as a catchment point serving not only Hai El Amal and El Kours, but also the neighboring semi-urban areas.	Long term: register a new secondary school project in the Sectoral Development Plan (PSD) for the western zone, using state-owned land in this area. Short term: implement flexible time-based grouping for secondary subjects to reduce pressure. Close overcrowded streams (e.g. experimental sciences) in saturated schools and open them in institutions with structural comfort. Possibility of horizontal expansion of Mohamed Boussebiaat Secondary School.
Saïd Ben Chaïeb Secondary School	Location is the gateway to the northward urban expansion of Biskra municipality, with rapid	Redraw the school-assignment map to relieve geographic pressure by adjusting the school-map plan.

Secondary School	Problems	Proposals
School	demographic growth from new collective-promotional housing programs. These new neighborhoods have a young population and newly formed families, translating into pressure on the secondary school. Exceeding the theoretical capacity of the school map has required directing pupils from surrounding residential feeder areas to this institution.	Possibility of horizontal expansion by building additional classrooms within the institution's land holdings.

Photo No. (4): Structural Layout of Mohamed Krouf Secondary School



Mohamed Krouf Secondary School

Source: Google Maps + processed by student Amani Houhou

- Yard targeted for the secondary school's expansion project
- Secondary school yard
- Sports playground

Photo No. (5): Aerial View Showing the Internal Expansion Mechanism of the Institution



Vertical expansion

[illegible]

Available at: <https://spinnst.co.at>

Secondary School	Problems	Proposals
El Arbi Ben Mehidi Dr. Saadane Makki Mani Mohamed Khireddine Mohamed Belounar Si El Haouas Ahmed Hammouda Mohamed Bedjaoui Martyr Maache Ben Mabrouk	Dr. Saadane and El Arbi Ben Mehidi lie in the heart of Biskra's traditional urban fabric — demographically stable neighborhoods (aging population, young families moving to suburbs). This stability prevents pressure from turning "high," but they remain under "medium pressure" due to their historical reputation, drawing pupils from outside their catchment area via transfer appeals. Si El Haouas, Mohamed Belounar, and Makki Mani act as a connecting belt between dense and less-dense neighborhoods, regularly used by planners to relieve hot spots such as Saïd Ben Chaïeb or the western/northern schools — bearing moderate extra pressure to protect other institutions from collapse. Attractiveness of specializations and transport network: schools on major axes (Tolga road, city-center axes) are a preferred destination on parents' preference cards, raising enrollment above the neighborhood's natural rate.	As these schools are in the medium-pressure zone, the goal is prevention and foresight to keep them from becoming high-pressure. Strict control of transfer authorizations, closing the door on random transfers toward city-center schools except in genuine residency cases. Flexibly readjust, annually, the geographic catchment boundaries feeding these schools, redirecting surplus from fast-growing neighborhoods once indicators turn "red." Medium term: use the stability of medium pressure to carry out periodic renovation of internal facilities (labs, sports) in schools such as Ahmed Hammouda and Mohamed Bedjaoui, raising capacity efficiency without costly horizontal expansion. Optimal use of semi-boardings facilities — catering and transport services in schools such as Maache Ben Mabrouk — to absorb pupils from neighboring areas without increasing classroom overcrowding.

Table No. (9): Relative-Comfort Category

Secondary School	Problems	Proposals
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Secondary School	Problems	Proposals
Moudjahid Ghemri Mohamed Fateh The Martyred Brothers Obeid Allah Hassani Abdelkrim	Neighborhoods with public rental housing (LPL) house families often in a similar age bracket. The current comfort level may be temporary: as the years pass, the young children now in primary and middle school will grow, causing a sudden demographic influx that turns this school from "comfort" into "high pressure." Isolation and spatial risk: location on the Sidi Okba road (an active national/provincial road) poses pupil-safety challenges, compounded by a weak internal urban-transport network outside peak hours — partly explaining lower demand compared with city-center schools. Difficult-to-access urban peripheries such as Hai Sidi Ghezal and the Hassani Abdelkrim area, on the city's northeastern margins. The occupancy rate has dropped to 28 pupils, reflecting difficulty of access and pupils' reluctance due to distance and lack of regular transport — making it a "very local" institution that does not absorb citywide pressure.	A forward-looking study of feeder areas should not rely on the current low figure (28 pupils) at Ghemri Mohamed Fateh; conduct a census of pupils in surrounding primary/middle schools near the 1460-Housing-Unit district to plan for the coming wave of pupils over the next 3–5 years. Secure the institution's surroundings and transport system (Sidi Okba road); more intensive school transport would ease commuting and encourage use of vacant classrooms. Create safe crossings, warning signs, and traffic-calming measures in front of The Martyred Brothers Obeid Allah Secondary School. Allocate dedicated urban school-transport lines linking deep residential neighborhoods directly to the institution, encouraging parents to keep children enrolled and relieving pressure on the city center. Break the urban isolation of Hai Sidi Ghezal and redesign transport lines to connect Hassani Abdelkrim Secondary School with neighboring medium-pressure areas, allowing flexible, safe redirection of pupils. Rebalance institutions by redirecting the geographic surplus from nearby pressure lines toward Hassani Abdelkrim and Obeid Allah secondary schools, incorporating intermediate neighborhoods into their catchment areas to ensure pedagogical and spatial equity.

Conclusion

The study concludes that the crisis of educational facilities at the secondary stage in the city of Biskra for the 2025/2026 academic year is not a crisis of shortage in pedagogical infrastructure or human supervision, but rather a crisis of planning and spatial distribution. This is embodied in the discrepancy between stifling overcrowding in the secondary schools of the city center and its vital axes, such as Hai El Aliya, versus a surplus of unused capacity in peripheral institutions and new urban-expansion areas, as a result of isolation and difficulty of access. To remedy this imbalance, we recommend adopting extended structural strategies that include geographically re-engineering pupil "catchment feeders" through Geographic Information Systems and securing school transport, in parallel with urgent organizational solutions that ensure the current abundance of teachers is put to use through a "grouping" system and the activation of mobile/rotating classes, in order to improve the quality of education and ensure sustainable pedagogical and spatial equity.

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