

## **“EVALUATION OF SCHOOL BUILDING INDICES QUALITY SYSTEM” IN GREECE: A TOOL FOR DECISION MAKERS**

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***Abstract.** The Evaluation School Building Indices Quality System aims to develop principles, methodology and appropriate indices for the evaluation of the educational infrastructures in the Greek State. It is based on a complete survey of the existing status of educational infrastructure, from which specific indices are generated relating to quality for a specific school year, based on Greek standards (values, achievements, problems, needs etc). The ESBI methodology can be applied in any geographical area of a country with any population size (municipality, prefecture, region, state). The statistics and indicators from this survey promote the quality elements of educational infrastructures both in school units and in the overall educational level of the geographic area.*

The demand for “assessment everywhere” is considered in the modern world as one of the most frequently social requirements. This demand has a particular importance when it is connected with the area of education which is sensitive and important for the future progress of societies. The OECD Programme on International Student Assessment has led the way for a more generic application of assessment systems for all factors that constitute the extended educational sector (teachers, pupils, educational methods, equipment, teaching aids and infrastructures).

The relationship between student achievement and buildings condition has been perfectly expressed in the phrase of Prof. Berner “Good infrastructure is truly at the base of quality education” (see Glen I Earthman references). On the other hand the appraisal of the substantial investments, which are made in educational facilities, remains a largely unexplored field of research. PEB has determined two key issues:

- ∞ Is possible to develop reliable and effective criteria for evaluation, given the wide range of parameters from planning and cost effectiveness of building to their impact on the performance of the educational system as a whole<sup>1</sup>.
- ∞ How – under whatever arrangements – the value for money and better accountability for the use of public funds is ensured<sup>2</sup>.

These questions, where every modern educational system is facing, is of concern to investors and funding bodies, as well as those who are responsible for planning, managing and designing educational facilities. In Greece there are very good rules, laws, indices and pedagogical directions in designing and constructing new school buildings or measures to react to the earthquake problems, reinforce and improve the earthquake safety in public and private building constructions.

But until today, there has not been designed and applied an effective assessment system of educational facilities as an “all space”.

The “*Evaluation School Building Indices Quality System*” (ESBI-Qsystem) aims to develop principles, methodology and reliable and effective criteria for evaluation of educational infrastructures. The core ideas of the project are to:

- ∞ Propose and certify reliable and measurable indices.
- ∞ Give the possibility of comparing relevant sizes and features among school buildings within the same area or among different areas or even among different countries.

Obviously, the comparison should rely on indices, which are common among the entities to be compared.

The ESBI-Qsystem has been based on data of the Greek educational infrastructure situation (*e.g.* needs, values, good practices etc.) and reflects as the composed result of a multi annual research, thoughts and experiences, supported by numerous observations and data elaboration. It considers those physical, environment and organisational elements, which have a direct impact on the performance of educational investments, and provides elements of measurement of that performance.

The basic tool for the evaluation method is the QUESTIONNAIRE which concerns all school units in the geographical and educational areas being covered. The questionnaire should be answered by the Director of the School Unit with technical assistance from the Municipality Technical Services or from my assistants. An analytical guideline paper is also provided with the questionnaire.

All required information is obtained after the appropriate processing of the answers to about 200 questions covering many subjects or about 410 detailed questions, many of which are related among themselves, in order to obtain the intended conclusions.

Through an integrated survey of the existing status of educational infrastructure, specific indices and information relating to quality are generated either for a certain school year or (for some of them) or for a certain school period, which can be considered as an extended period (more than one school year). These data are used to compile educational infrastructure-related indicators on use and availability of space and equipment; facility and equipment age, condition and need and safety and security requirements. Concerning on the geographical / educational / administrative reference area<sup>3</sup>, the application of the ESBI-Qsystem gives detailed and specific information (indicatively):

- ∞ The number of students enrolled, classes, teachers, foreign students and students with special educational needs, by level of education.
- ∞ The number, ownership and age of school buildings, school operating hours, and the number and size of teaching and non – teaching spaces (indoor and outdoor), by level of education. Needs in classrooms, buildings, facilities etc.
- ∞ The number of schools with certain safety and security features and structural faults (*e.g.* parapet faults or cracks in building).
- ∞ The number of schools with maintenance requirements, by level of need (five levels, from immediate action to no action) and by type of structure of amenity (16 structures including staircases, insulation, garden and boiler room).
- ∞ Availability, condition (new, old or very old) and immediate – and short – term requirements for school equipment and furniture, such as computers and libraries.
- ∞ The number of schools with (and without) infrastructure for cultural and athletic activities, according to the cultural and athletic activities of pupils per school unit.
- ∞ The number of training spaces, society offices, and spaces for social and community activities.

Furthermore, according to the opinion of school directors, the existing risk areas are defined in detail and explicitly together with all factors that may cause accidents within the school premises and, especially, areas or deficiencies that may cause accidents or damages in the event of earthquakes.

The ESBI-Qsystem indices stipulate the profile and estimate the quality of the educational infrastructure within a single school unit and – accumulatively – within the entire reference area.

The multi purposes of the survey's results should be underlined:

- ∞ The statistics and indicators of the ESBI-Qsystem arise from a single school unit level and, gradually, accumulate in higher geographical and/or administrative area, thus the system can be applied in any geographical and/or administrative area of different population size (community, municipality, prefecture, region, state).

Taking into account the particular educational, pedagogical and structural features, the ESBI-Qsystem can be applied internationally, using relevant necessary adjustments (*e.g.* collecting information methods, elaborating with the data base etc.).

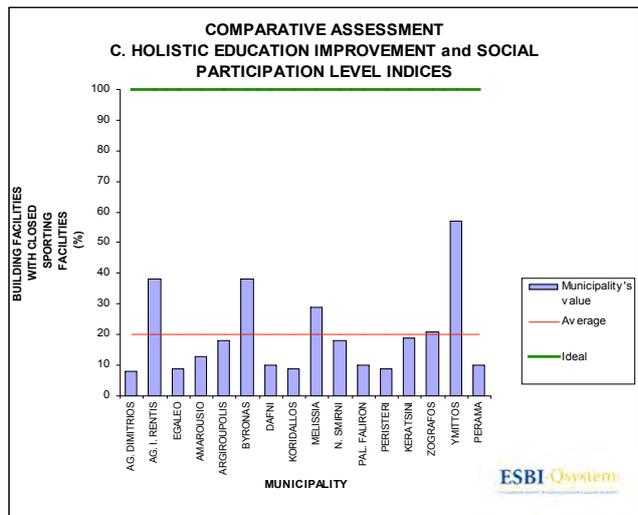
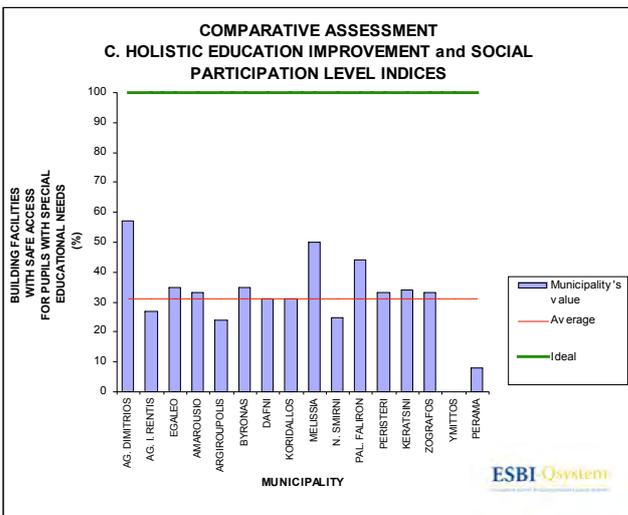
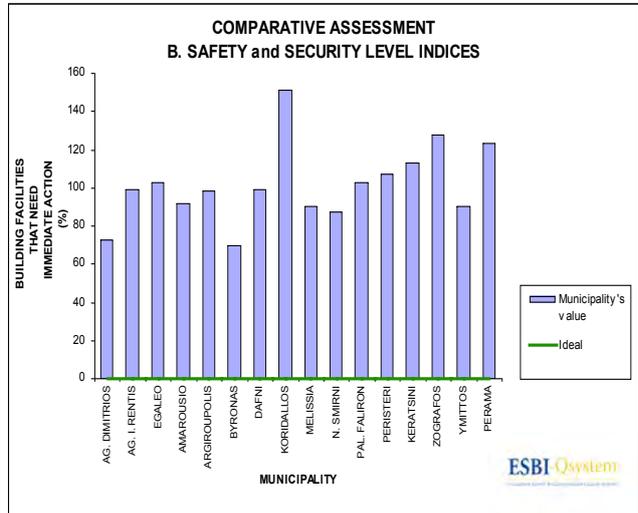
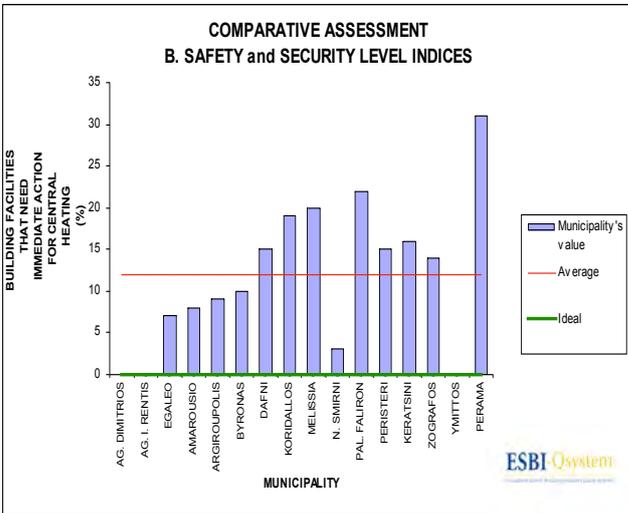
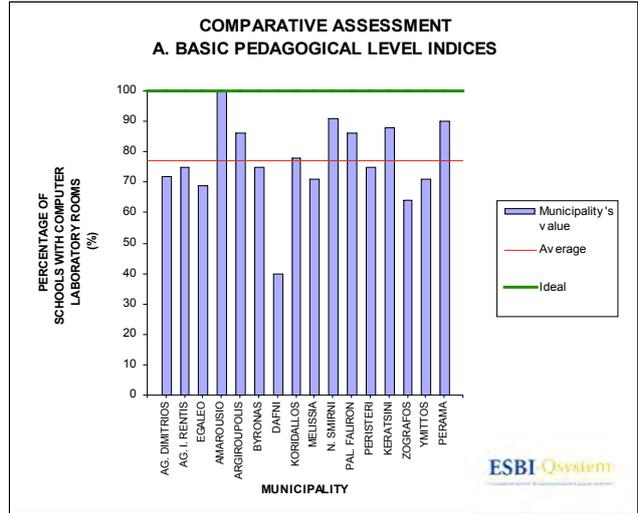
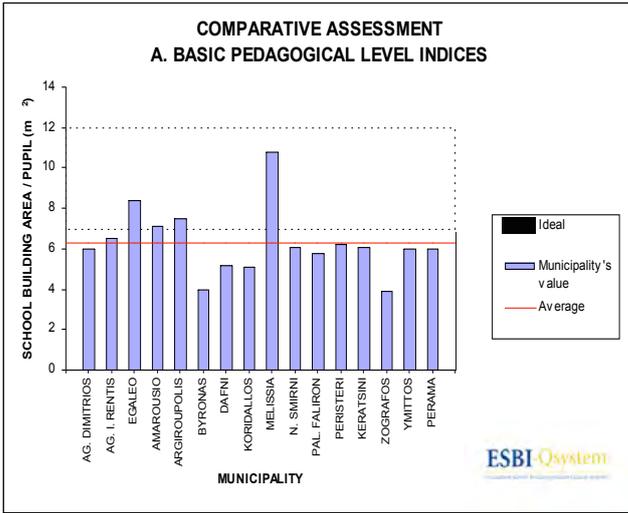
Since the ESBI-Qsystem indices offer all the information needed to answer the questions: “*what to do*” and “*what it costs*”, it can be a reliable tool of helping those responsible for the planning and management of educational investments to make decisions which lead to updating and improving the quality level of Educational Facilities with the best usage of money.

The ESBI-Qsystem can also be a reliable tool for those responsible for planning and management of Educational Programs funded by international Institutes as the European Investment Bank (EIB), the Council of Europe Development Bank (EDB), the World Bank (WB), the European Bank of Reconstruction and Development (EBRD) etc. Especially for the EIB, which performs a triple analysis (technical, economic and financial) of all projects submitted for finance, the performance of indicators is a key for a reliable appraisal of educational projects<sup>4</sup>. In this framework, the ESBI-Qsystem can be reliably used to:

- ∞ Evaluate real needs.
- ∞ Implement the appropriate (physically and financially) interventions.
- ∞ Audit the effects, through all stages of program and project cycle, ex-ante, interim and ex-post for any programme funded by EIB, concerning on restructuring and improving of educational infrastructure, in any country.

A sample of tables, which constitutes a part of the entire range of tables included in ESBI Qsystem, and the results of a survey that was conducted for the Municipality of Egaleo in Attica Region, from 11/2004 till 02/2005 is attached below.

Furthermore, a Comparative Assessment of the results of an evaluation project, which was applied on 713 schools units for 16 Municipalities, in the area of Attica was performed aiming to contribute in the discussion of PEB:



Speaking about an International Evaluation Quality System we must have in mind that we are talking about a system applicable to all states with several economical, social and political systems, several religions and cultural status, several wealth and social protection priorities.

The main questions for that are:

- ∞ How can we decide and demand common indices that are easily measured and applied with objective ways?
- ∞ Which are these common indices that can be certified for an International Evaluation Quality System, since this is the main purpose of PEB initiative that started in Lisbon?
- ∞ And how can we compare these certified indices for different school buildings, for various areas of even for different countries ?

Having the experiences from the results of ESBI – Qsystem and speaking about quantitative, measurable and objective criteria in an International Evaluation System Indices. **23 indices are introduced as “COMMON INDICES”** that can be certified and applied in all educational systems, adapted in order to meet local, regional, national and international needs and can be compared among different countries in order to classify and certify the Quality Level of the Educational facilities within a reference area. These Indices are classified in 3 categories:

- ∞ **Basic pedagogical indices:** ratio of students per classroom; ratio of building plot area per student; ratio of closed space area per student; ratio of student per computer; and percentage of facilities with computer laboratory spaces.
- ∞ **Safety and security indices:** percentage of facilities with inadequate resistance to earthquakes (structural and non-structural); percentage of facilities with an evacuation plan; percentage of facilities with safety lighting; percentage of school buildings located in potentially hazardous areas (*i.e.* petrol station, industrial area, etc.); percentage of facilities requiring immediate action for insulation, plumbing installations, central heating, boiler rooms, fire safety equipment, etc.
- ∞ **Educational improvement and social participation indices:** percentage of schools with whole-day classes, special cooking and dining rooms, safe access, toilets for pupils with special educational needs, and sports facilities.

In this appendix, we present a set of brief descriptions of the tables that constitute the ESBI – Qsystem. The indicative indices' values are part of the results of a survey that was conducted for a Municipality in the Egaleo region from November 2004 until February 2005.

### **Table 1**

Table 1 presents general pupil and teacher data in the Municipality.

- ∞ 10% foreign pupils (almost equal to the national average 10.5%).
- ∞ 2% pupils with Special Educational Needs (SEN) (only in the public Educational System).
- ∞ Ratio pupils/teacher 10/1.
- ∞ Ratio pupils/school 158/1.

- ∞ Ratio pupils/class 21/1.

### **Table 2**

Table 2 contains the information about the shift operation of the schools.

- ∞ Morning classes 96%.
- ∞ Reception classes 8%.
- ∞ Pupils in reception classes 5%.
- ∞ (Foreign pupils 10% - Table 1).
- ∞ Morning operation pupils 95%.

### **Table 3**

Table 3 contains mainly the information about the ownership of the classrooms (public or rented or granted buildings).

- ∞ Classrooms in public buildings 96%.
- ∞ Ratio pupils/public classroom 20/1.
- ∞ Ratio pupils/classroom 19/1 (Public, rented, etc).

### **Table 4**

Table 4 contains the data for whole day schools (kindergarten and elementary) and the transportation facilities being used by pupils.

- ∞ 46% of the existing kindergartens have introduced whole day classes while the whole day classes constitute 40% of all morning classes and 38% of the total number of pupils attends them.
- ∞ All (100%) of the existing elementary school units have introduced whole day classes, where the whole day classes constitute 30% of all classes and 34% of the total number of pupils attend them.
- ∞ Schools with whole day classes 68%.
- ∞ Pupils in whole day classes 34%.
- ∞ Transportation with private means 97%.

### **Table 5**

Table 5 contains data for the cultural activities of the pupils (school units and pupils). These data must be related with the data in other tables for the infrastructure and facilities that are used or promote cultural activities. These data also help very much the responsible official persons and authorities from the Municipality or from the Education Management Staff to encourage the cultural interest of the pupils through special and target actions.

- ∞ 22% of school units or 9% of pupils have no cultural activities (especially in kindergartens and

in SEN elementary schools).

### **Table 6**

Table 6 contains data for the athletic and environmental activities of the pupils (school units and pupils). These data must be compared (put together) with the data from Table 11 in which we can see the existing athletic infrastructure in the same school area. That could be a very good way to explain data of Table 6 for deciding to maintain existing or construct new athletic facilities and infrastructures.

- ∞ 36% of school units or 14% of pupils have no athletic activities at all.

### **Table 7**

Table 7 contains general technical data of plots and building facilities and the ownership of school buildings.

- ∞ 93% of school buildings are public in this Municipality.
- ∞ Average value for (public and rented) school buildings plots (area in m<sup>2</sup>) 4 175.
- ∞ Average value for (public and rented) school buildings closed space (area in m<sup>2</sup>) 1 761.
- ∞ Ratio of (public and rented) buildings plots area per student 19.9m<sup>2</sup>.
- ∞ Ratio of (public and rented) buildings' closed spaces area per student 8.4m<sup>2</sup>.

### **Table 8**

Table 8 contains data for the age of school buildings in the area in which the survey is conducted.

- ∞ Almost all existing school buildings (96%) are constructed or expanded from 1980 until today.

### **Table 9**

It contains basic technical data for school buildings facilities such as data for the construction type, the number of stories of the buildings, etc.

- ∞ 97% of the school buildings are constructed using concrete or they are preconstructed (safe constructions)
- ∞ Only 35% of the buildings have safe access for SEN pupils.

### **Table 10**

It contains data for special educational spaces in school building facilities such as laboratories, special classrooms, etc. There are many indices that can be used to evaluate the quality of the areas used by school units.

- ∞ Classrooms with area <40m<sup>2</sup> 16%.
- ∞ School buildings with library 66%.
- ∞ School buildings with computer laboratory 69%.

- ∞ School buildings with W.C. SEN 22%.
- ∞ School buildings (whole-day schools) with kitchen 23%.
- ∞ School buildings (whole-day schools) with dining room 29%.
- ∞ School buildings with closed sport centre 9%.

**Table 11**

Table 11 contains data for the athletic infrastructure of school building facilities.

- ∞ Average value of school buildings yard: 2 319 m<sup>2</sup>.

**Table 12**

Table 12 contains data for the external spaces of school buildings facilities such as condition of the yard, surface material of the yard, information about garden area, etc.

**Table 13**

Table 13 contains data for the lessons that pupils have taught for earthquake prevention and information about the responsible body (service) for teaching prevention lessons.

**Table 14**

Table 14 contains information about the dangerous spaces (general danger places) of buildings areas that could cause accidents to pupils.

- ∞ Petrol station in the neighbourhood of the school buildings 2%.
- ∞ Dangerous industry in the neighbourhood of school buildings 13%.
- ∞ Protective bar at the exit of school buildings to roads with heavy traffic 48%.
- ∞ Protective material against slippery in staircases 27%.
- ∞ Evacuation plan during earthquakes 33%.
- ∞ Automatic fire extinguishers in boiler rooms 90%.
- ∞ Safety lighting 43%.

**Table 15**

Table 15 contains information about the special danger issues during earthquakes.

- ∞ Dangerous construction areas 37%
- ∞ Cracks in building columns 2%
- ∞ Broken glasses 15%
- ∞ Parapet faults 11%

- ∞ Destroyed coatings 43%
- ∞ Problems for pupil safety (except previous) 35%

### **Table 16**

Table 16 contains data on the condition of building facilities and the period in which appropriate works have been performed.

- ∞ 9% of school buildings have been repaired in a period more than 10 years ago (the last time)
- ∞ 24% of school buildings have never been repaired (including new ones),

### **Table 17**

Table 17 contains data on the repair and maintenance requirements for 14 categories of the most common maintenance works and needs. This table provides useful information to the Municipality Technical Services on how to distribute the available money for maintenance, in order to achieve a better educational environment in the existing school buildings, for which they have the responsibility for repairs and maintenance works.

### **Table 18 to 20**

Tables 18 to 20 contain data for the existing equipment and furniture of school buildings for kindergarten (Table 18), elementary schools (Table 19) and secondary schools (Table 20). By providing information on the age, the needs and the immediate requirements of schools for furniture and equipment, decisions can be made for the appropriate actions to solve the existing problems while the condition of the educational environment can be evaluated concerning the existence and quality of equipment.

### **Table 20 to 21**

They contain general data reports for the existing school units and buildings and the requirements in building new classrooms.

## **Basic report**

All the results of the survey and its assessment procedure, a part of which is presented in the attached tables, are summarised in Table 1.

## **Conclusions**

The present survey was conducted for a specific municipality and therefore it was not possible to make a comparative assessment of all indices being defined. Nowadays, ESBI – Qsystem has been conducted for more than twenty municipalities in Attica.

These municipalities constitute a very good database, because the number of school units that each one includes lies in the wide range of 13 to 141 units. At the same time, we can have several important results since we have information from municipalities in which different classes of people are living (poor, rich, middle financial income, etc). The comparison of several indices for different schools and different areas is the main idea of the evaluation management that ESBI – Qsystem concerns.

It is important to indicate the ESBI methodology and the way it is reported can give us any information for anything that has a particular interest and for any school unit and school building in the area of the survey. If some of ESBI Indices among others are going to be confirmed at a community (E.U.) or at an international level (OECD) and especially if we can manage to develop and implement an International System for the Evaluation and Quality in Educational Facilities, this should be a very useful

and necessary progress in the Educational System all over the world.

### *Notes*

1. "The Appraisal of Investments in Educational Facilities", papers and conclusions of an international conference on the evaluation of investment in educational facilities, organised by PEB in collaboration with the Projects Directorate of the European Investment Bank in Luxemburg in November 1998.

2. "Financing Capital and Recurrent Expenditure on Educational Facilities", International Seminar organised by PEB in co-operation with the Spanish Ministry of Education and Culture in Toledo, February 2000.

3. For example, community, municipality, prefecture, region, state, other.

4. At the European Council meeting in Amsterdam on June 1997, the European Commission urges the EIB "to examine its scope of intervention in the areas of education".

**Table 1. Basic report of school survey for the municipality Egaleo**

### *Basic data*

		<b>Total number</b>	<b>% of schools</b>
<b>Schools</b>		64	
<b>School building facilities</b>		46	
<b>School buildings</b>		80	
<b>Students</b>		10 116	
<b>Classes</b>		492	
<b>Requirements in classrooms</b>	Positive	55	
	Negative	80	
<b>Morning operation only</b>	Classes	449	96
	Students	9204	96
<b>Foreign students</b>		971	10
<b>Students with special educational needs</b>		174	2
<b>Teachers</b>		998	

### *General assessment indices*

Ratio of students per school	158
Ratio of students per class	21
Percentage of classes in only morning operation	96%
Ratio of pupils per teacher	10
Ratio of pupils per public classroom (Public and permanently granted buildings)	20
Ratio of pupils per classroom (public, rented and granted buildings)	19
Ratio of public building facilities per total building facilities (public and permanently granted buildings)	93%
Ratio of building plots area / pupil (in m <sup>2</sup> )	19,9
Ratio of building closed spaces area per student (in m <sup>2</sup> )	8,4
Percentage of building facilities that were constructed or extended after 1990 (age of buildings)	63%
Plots of building facilities (average area in m <sup>2</sup> )	4 175

Closed spaces of building facilities (average area in m <sup>2</sup> )	1 761
External spaces of building facilities (average area in m <sup>2</sup> )	2 319

Ratio of students per computer	Elementary schools	44		
	High schools	23		
	Lyceum - tpe	33		
WHOLE DAY CLASSES IN	KINDERGARTEN	40%	PERCENTAGE OF CLASSES	
	ELEMENTARY	30%		
	KINDERGARTEN	38%	PERCENTAGE OF PUPILS	
	ELEMENTARY	34%		

CONSTRUCTION TYPES OF SCHOOL BUILDINGS	
● CONCRETE AND PRECONSTRUCTION	96%
CONDITION OF BUILDING FACILITIES (Bad and Very Bad)	9%
BUILDING FACILITIES THAT WERE NEVER MAINTAINED	24%
BUILDING FACILITIES THAT NEED ALTERATIONS OF THEIR SPACES FOR IMPROVING THE EDUCATIONAL ACTIVITIES	54%

BUILDING FACILITIES THAT NEED IMMEDIATE ACTIONS FOR	
● INSULATION	37%
● PLUMBING INSTALLATIONS	13%
● HYGIENE AREAS	20%
● CENTRAL HEATING	7%
● BOILER ROOMS	0%
● EXTERNAL AREAS (YARDS)	26%

BUILDING FACILITIES WITH SAFE ACCESS FOR PUPILS WITH SPECIAL EDUCATIONAL NEEDS	35%
PRIVATE TRANSPORTATION OF PUPILS TO SCHOOLS WITH WHOLE DAY CLASSES	97%
BUILDING FACILITIES WITH COMPUTER LABORATORY SPACES	69%
Building facilities with closed sporting facilities	9%

BUILDING FACILITIES WITH THEATRE STAGES (IN GENERAL PURPOSE SPACES)	80%
BUILDING FACILITIES WITH WC FOR PUPILS WITH SPECIAL EDUCATIONAL NEEDS	22%

BUILDING FACILITIES WITH A BAD OR VERY BAD CONDITION OF EXTERNAL AREAS (YARDS)	26%
BUILDING FACILITIES WITH NO GARDEN	9%

SCHOOLS APPLYING THE MOST FAVOURABLE CULTURAL ACTIVITY (PERCENTAGE OF SCHOOLS)	•PAINTING 42%
SCHOOLS HAVING NO CULTURAL ACTIVITIES (PERCENTAGE OF SCHOOLS)	22%

SCHOOLS APPLYING THE MOST FAVOURABLE ATHLETIC ACTIVITY (PERCENTAGE OF SCHOOLS)	•GYMNASTICS 53%
SCHOOLS HAVING NO ATHLETIC ACTIVITIES (PERCENTAGE OF SCHOOLS)	36%

SCHOOL BUILDINGS WITH SPACE AVAILABILITY FOR CONSTRUCTING 5X5 FOOTBALL GROUND (where it does not exist)	27%
SCHOOL BUILDING FACILITIES WITH NO ATHLETIC INFRASTRUCTURE	30%

SCHOOL BUILDING FACILITIES WHERE A PROTECTIVE BAR EXISTS AT THEIR EXIT	48%
SCHOOL BUILDING FACILITIES WHERE AN EVACUATION PLAN DURING EARTHQUAKES EXISTS	33%
SCHOOL BUILDING FACILITIES WHERE SAFETY LIGHTING EXISTS	43%

SCHOOL BUILDING FACILITIES WHERE <b>NO PREVENTION LESSONS</b> WERE TAUGHT CONCERNING EARTHQUAKES	36%
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SCHOOL BUILDING FACILITIES WHERE THERE ARE DANGEROUS CONSTRUCTION AREAS CONCERNING EARTHQUAKES	37%
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SCHOOL BUILDING FACILITIES WHERE THERE ARE CRACKS IN COLUMNS	2%
SCHOOL BUILDING FACILITIES WHERE THERE ARE:	
• BROKEN GLASSES	15%
• PARAPET FAULTS	11%
• DESTROYED COATINGS	43%
• PROBLEMS IN EXTERNAL AREAS (YARDS)	48%
SCHOOL BUILDING FACILITIES WHERE THERE ARE SAFETY PROBLEMS FOR PUPILS	35%

## EQUIPMENT AND FURNITURE DATA OF SCHOOLS

<b>KINDERGARTEN</b>	
MINIMUM ADEQUACY IN EQUIPMENT AND FURNITURE	
• VIDEO • BUS TOYS	46%
MAXIMUM AGE OF EQUIPMENT AND FURNITURE	
• PAPER CASE	60%
MAXIMUM IMMEDIATE REQUIREMENT FOR EQUIPMENT AND FURNITURE	
• TELEVISION APPL.	42%

<b>ELEMENTARY SCHOOLS</b>	
MINIMUM ADEQUACY IN EQUIPMENT AND FURNITURE	
• COMPUTER DESK	50%
MAXIMUM AGE OF EQUIPMENT AND FURNITURE	
• LIBRARY	39%
MAXIMUM IMMEDIATE REQUIREMENT FOR EQUIPMENT AND FURNITURE	
• COMPUTER	50%

<b>SECONDARY EDUCATION SCHOOLS</b>	
MINIMUM ADEQUACY IN EQUIPMENT AND FURNITURE	
• BENCH WITH DESK	55%
MAXIMUM AGE OF EQUIPMENT AND FURNITURE	
• MAP HANGER	42%
MAXIMUM IMMEDIATE REQUIREMENT FOR EQUIPMENT AND FURNITURE	
• PHOTO COPYING MACHINE	45%