



**Environmental Design Standards Necessary For The
Quality Of Education In Primary Schools In The Region Of
Greater Cairo**

Submitted By

Hoda Mohamed Ibrahim El-Baz

B.Sc. Engineering (Architectural), Faculty of Engineering, Ain Shams University,
2000

Master in Environmental Sciences, Institute of Environmental Studies and Research,
Ain Shams University, 2009

A thesis submitted in Partial Fulfillment

Of

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In

Environmental Sciences

Department of Environmental Engineering Sciences

Under The Supervision of:

1-Prof. Dr. Magda Ekram Ebaid

Prof. of Environmental Architecture

Head of Department of Environmental Engineering Sciences

Institute of Environmental Studies & Research

Ain Shams University

2-Prof. Dr. Abdel Meseeh Samaan Abdel Meseeh

Prof. of Environmental Education

Head of Department of Educational Sciences & Environmental Media

Institute of Environmental Studies & Research

Ain Shams University

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This thesis Towards a Doctor of Philosophy Degree in

Environmental Sciences Has been Approved by:

Name

Signature

1-Prof. Dr. Safa Mahmoud Eissa Abdou

Prof. of Architecture

Faculty of Engineering

Menofia University

2-Prof. Dr. Moheb Mahmoud Kamel Al-Rafi

Prof. of Environmental Education & Head of Department of Environmental

Educational & Mass Communication Sciences

Institute of Environmental Studies & Research

Ain Shams University

3-Prof. Dr. Magda Ekram Ebaid

Prof. of Environmental Architecture

Head of Department of Environmental Engineering Sciences

Institute of Environmental Studies & Research

Ain Shams University

4-Prof. Dr. Abdel Meseeh Samaan Abdel Meseeh

Prof. of Environmental Education

Vice Dean of Institute of Environmental Studies & Research

Ain Shams University

Abstract

Since education is the cornerstone of human resources development and development to meet the requirements of the comprehensive renaissance of countries, sustainable development is the main factor for land development. The role of the architect in this field is very important as it is always seeking innovation and development in the areas of planning and design in the public interest. Sustainable development is the key factor in the development and reconstruction of the Earth and the preservation and sustainability of such reconstruction without compromising the natural balance created by God for all components of the universe and leading to ecologically balanced integration. In order to achieve this, the architect must seek to innovate and develop in planning and design for the benefit of land and human beings, and away from any negative influences on the ecological balance and agree to the system of the universe and its maintenance and to ensure the right of subsequent generations to benefit nature. It is important to shed light on these schools and ways to achieve the principles of sustainability in their architectural design to be the nucleus of influence in society. The aim of sustainable schools is to raise the environmental awareness of students and teachers through some environmental activities Which aims to reduce the negative impacts on the environment, especially in the field of water, energy, air and waste. The research problem is the lack of implementation of the concepts of sustainability in the planning, design and development of public school buildings in Egypt, which have negative impacts on the performance of schools for their environmental, economic and social role, as well as at the level of scientific students and their awareness of the dimensions of the concept of sustainability and its role in creating environmentally friendly communities. The study focused on the public schools of basic education in the Greater Cairo Region, where the reality of education in these study cases, and the study of the concept and principles of sustainable school (CSIR & Built Environment Unit, An Architect's Guide to Designing for Sustainability, Pretoria, South Africa , CAA, November 2006), and their applications at the urban level, to be used in accordance with the reality of public schools in the Greater Cairo Region. The study also examined the impact of applying quality standards on selected schools in all its aspects, comprehensive design standards which can be applied in public schools in general, and then prepare an analytical study of the selected schools and evaluate their level of sustainability using LEED for existing and new school assessment systems to identify weaknesses to identify sustainability problems and

provide appropriate solutions. The study used the descriptive causal comparative and analytical method in its various stages. The basic case study was represented in the Al-Ahram State School for Basic Education in Giza Governorate, and it was used for the first time. Several procedures were applied in the current research as field visits to school site and take measurements of some chapters of the variable light intensity and design of industrial lighting in one of the chapters list using the design builder program. The research also found the importance of disseminating the idea of modern education, such as education in open spaces, as a solution to some of the problems of this type of school, including the lack of belonging to the school and increasing student density. And through reaching the school's assessment by applying the criteria of the general requirements of the General Authority for Educational Buildings for the basic education schools in the existing cities and the LEED standards for the schools and the design criteria of the Egyptian schools. The research tools were the exploratory study through field visits of samples of a number of schools in Greater Cairo, And to meet with experts and officials in charge of development in public schools and the use of questionnaire forms from samples of teachers, administrators and students in the selected schools as samples in the selected schools as samples of the subject of research by two schools in each of the S previous three, the research found at the end of the study the general conclusion that the public schools in the Greater Cairo region as it stands does not allow it to achieve sustainability and quality of education. The results of the evaluation, along with other research tools, draw conclusions about the reality of public schools in the Greater Cairo Region. The most important of these is the failure to achieve the majority of sustainability criteria and the quality of education, taking into account the need to adopt the principles of sustainability in urbanization and propose criteria that meet the requirements of the Egyptian environment The criteria for satisfaction and quality standards for education include the development of existing schools or when designing future schools.

Keywords: (Development - Sustainability - Environment - Quality).

Summary

Introduction:

The majority of the World realized the importance of human resource wealth in the process of civilization. Investment in Education process and training are the core of present needs and future achievements for better standard of living.

As for Egypt, since the education became its first national project that aims to “excellence for all”, the Ministry of Education has started an aspiring project to prepare and set up national standards for education in Egypt achieving the principle of “comprehensive quality” considering that the national standards are specified for the desired quality in the organization of learning and education with all their elements.

This research will study education quality assurance from the perspective of achieving the principle of sustainable development that enables the students to benefit from all the provisions of educational process that can increase their acquirements of more experiences in the frame of the Environmental Dimensions.

The case study was selected to be applied on (primary schools) that lie in a semi Mediterranean territory that Cairo lies in as an environmental limitation of schools’ designing .Through studying the chart referred to, it becomes clear to us the following.

The Semi Mediterranean territory needs or to heated by mechanical equipments for a period of 3 months and heating by passive equipment’s for the night between 4-8 months.

We find that in order to look out to the future of the educate our children effectively and fruitfully, it is necessary to adhere to the principle of flexibility in the design of educational buildings from an environmental perspective to fit with the ongoing development of curricula, so that you can utilize the available spaces for the different educational activities, taking into account the simplicity and character of the aesthetic in general.

Research Tools:

The data of the research was collected using the following tools :

- 1- Surveys and remarks.

- 2- Documents, records of projects, data and education development decisions.
- 3- Meeting with the experts and specialists in such field.
- 4- School Questionnaires in the study sample

Research Problems:

- 1- Quality Assurance standards are one of the basic limitations for raising the efficiency of the educational process, and they should be known, understood, and easy to apply (source: National Authority for Education Quality Assurance and Accreditation – Standards of Quality Assurance and Accreditation of pre-university educational institutions 2009 – Egypt) .
- 2- The educational process in the primary schools needs good attention to control education quality more than any other stages. (Source: Abdel-Hamid Abdel-Magid Hakim – A vision for future school in the light of all comprehensive quality standards and tests of some developed countries – education and psychology – Teachers’ Faculty of Mecca – Om Elkora University 1421 Hegira).
- 3- Most of the existing Primary school buildings don't meet the quality assurance standards, which leads to the failure of its educational process.
- 4- There is poor designing in primary schools buildings in Egypt from the perspective of the environmental architecture of designing and execution, especially for power saving and achieving: natural lighting – ventilation – yards and so on. It is needed to reconsider the design and architecture formation of primary schools.
- 5- Economical cost for achieving quality standards especially in government primary schools needs to a budget provided by the state. Therefore, applying environmental architecture standards in schools reduces the burden of such cost (source: Mohamed Ibrahim Mansour – Information and Decision-Making Center – Future vision of Egypt 2006-2030).
- 6- Effect of applying education quality standards on school buildings and the extent to which such standards meet the needs of the educational process whether the building is new or existing. is not identified in Egypt now.
- 7- The followed maintenance systems in most schools have no enough awareness of the importance of keeping the environment in good conditions (Source: General Authority for Housing and Building

Researches and Urban Planning – Ministry of Education – Designing Standards of Primary Schools of the Greater Cairo, May 1990).

Research objectives:

- 1- Setting a primary school designing code that meets the requirements of education quality assurance in the frame of environmental architecture.
- 2- Preparing a statistical program defining and monitoring the basic problems of the primary schools that negatively affect the education quality in such primary schools and analyzing its causes.
- 3- Setting a vision for solving the design and environment problems of existing schools in order to apply it in Egypt.
- 4- Studying the school specifications, space limitations and design such as: condition of the building, space ratios, primary components, safety and security that are newly used to match the standards of education quality assurance.
- 5- Setting the affected ranges of existing school buildings and the extent of meeting and not meeting modern education quality standards.
- 6- Studying the architectural software that can be used in new schools or in the existing schools in order to enhance the environmental performance and reducing power consumption to achieve the sustainable development.
- 7- Defining the school buildings on the Geographic Information System to select environment and sites of the schools because site selection is one of the quality assurance standards
- 8- Studying the possibilities of applying schools' evaluation thorough the international certificate “ LEED : Leadership Environmental Energy Design” to apply the environmental architecture according to evaluation different points that conform with the nature and economy of Egypt in the frame of achieving education quality assurance standards.

Research Methodology :

Methodological Procedural steps depend on induction and analytical exchange of information and application and practical studies that comprise the following:

First Pivotal : Theoretical Frame:

It is a reference study depending on the following:

Accurate inclusion of all information, data and statistics that are related to education quality standards and LEED Certificate and what were newly

introduced from conditions and requirements that serve the educational process with all its aspects in order to identify the following:

- The extent of its influence in the educational process of the primary stage and the new education methods generated.
- Types, specifications and requirements of internally and externally educational spaces the are newly brought by such standards
- Revising most of what was written in such fields such as articles, books and researches and setting theoretical reference in this research

Second Pivotal: Application Frame:

Such analysis depends on practical study for some primary school buildings through the following:

- Field surveying of the land use of the selected schools in the research
- Preparing the drawings for the school building identifying the vertical and horizontal sections, horizontal plans, elevation, roofs and yards with environmental architectural treatments to use in selecting sites and surrounding environments of the schools and identifying the sites of the school buildings on (GIS :Geographical Information System) .
- Preparing a questionnaire, part of which is dedicated to the standards of education quality and its security requirements and other part for the conditions of environmental architectural designing.
- Studying the educational requirements and spaces for the identified school stage.
- Setting an approach for solving the current problems of schools on a cadastral map with suitable diagram scale in the light of education quality standards and the environmental architecture standards.

Research Limits :

The research will be tackled in an identified limit as follows:

A- Educational Stage limit:

Primary school stage (comprises the primary and preparatory stages) because of their importance and sensitivity of such stages in the levels of education and their link with wide age category, especially when the strategic planning of Egypt is to develop primary schools.

B- Space limits:

Primary schools that are located in the Grater Cairo territory (Semi-Mediterranean territory as one of Egypt's Climatic Regions).

Research contents:

The research consists of four main chapters in an integrated system; each of which addresses specific elements of the study as follows:

First part : Theoretical study

Part one: Historical background on primary schools:

This part tackles the concepts and previous studies contained in the research through two integrated chapters:

Chapter I: *Definitions and Concepts:*

Includes the meaning of education quality, concept, objectives and standards to be achieved in schools to reach such quality and environmental architecture, including a brief on the "LEED" certificate, standards, and requirements, and includes the basic concepts related to school environment, components, elements and constituents and the performance of such constituents in the current situation and if such constituents functions or not? And its performance methods, and how it can enhance the performance of such constituents to suit this stage, and the definition of the educational process and its elements and the problems facing education in primary their schools in Egypt, highlighting the importance of studying cognitive, mental and physical dimensions of the child at this stage and their impacts on design of spaces. Their chapter also reviews other expressions that are contained in the search.

Chapter II: *local and global experiments in the relevant field.*

It deals the Pioneer international examples in the development of education, and includes the study and analysis of some of these experiments.

Previous studies: Of global trends in this area:

What the Henry San(1) off and others mentioned in a book entitled "Methods for assessing school building," that it is not only the curriculum that must be developed to improve the results of learners, but also the school buildings that must be developed to be valid for teaching the learners properly.

As well as what was done by the Kingdom of Bhutan from creating standards for school building and its design of the primary stage in order to improve school buildings to commensurate with the primary school students, and to achieve their access to the best results in education .

Part II: design standards for energy rationalization in schools from the perspective of quality assurance standards and their impact on the primary education:

In this part, the study is focused on clarifying the importance of improving the environment functionality performance of educational spaces in increasing the efficiency of students and improving the quality of education (where the Organization of CHPS has confirmed that it can improve the results of students in schools that has a good internal environment by 20% due to good lighting and thermal equilibrium and Protect the health of students and staff (which reduces absenteeism) and saving money over the life of the building. This part also includes the architectural Environment Identifying the steps for the environmental architectural design of educational spaces by utilizing climate information of Territory climate in which the school is located, and evaluation of internal conditions that meet the thermal satisfaction of the occupants of the building and knowing the nature of the building's occupancy and its function to determine its thermal load. This part also tackles understanding of the properties of construction materials and thermal insulation used in the building, and identifying designing methods and procedures of the building as lighting, natural and artificial ventilation. This part is divided into two chapters:

Chapter III: *The occupational designing standards of education spaces in order to reduce the energy consumed in schools.*

This includes changing the shape and type of vacuum through the flexible vacuum in response to the changing requirements and changing the materials used in construction and finishing to reduce energy consumption and studying the properties of the elements of the vacuum in order to improve environmental performance in schools, through a review of the development of methods of energy rationalization and building materials and its impacts on the design of schools. This part also deals with innovative solutions in schools of primary education and the new visions that deal with building schools environmentally on the basis of conscious thinking with the constituents of the educational process to achieve quality standards of education.

And studying different points of the evaluation with "LEED" certificate, through the tools used, such as Check lists and extracting what is consistent with the nature and economies of Egypt. displays a perception of changes in the school spaces in (the study of functional design in light of digital technology (case study of reducing energy consumption in educational institutions), for example: providing additional spaces for students inside the building and outside, and increasing the proportion of some spaces and the emergence of new spaces, and there are spaces allocated to the activities that don't differ in size.

In the end, this chapter will conclude the environmental architecture data that can be applied in schools to service quality standards of education.

Chapter IV: *Standards for Quality Assurance of education for building primary schools,*

How to achieve them within the school, whether new or existing as one of the solutions proposed to raise the level of education in Egypt, and in the light of the four key areas of these standards which are: the school site, educational spaces, physical environment of the school and the factors of security and safety. The chapter also reviews the methods of modern education and its impact in the design or the provision of spaces in schools. At the end, this Chapter will conclude the impact of standards for Quality Assurance of education on the primary education with all its aspects, which will be useful is setting the approach to the design features of the proposed school of research.

Part two: application study

Part III: Application civil study of selected schools in the Greater Cairo:

This part aims to link theoretical material with practical experience in schools, and also tackle a case study of Egyptian schools in an exclusive manner depends on the models of the proposed buildings, and through analysis of questionnaires for the schools samples of the case study.

Chapter V: *Methods and techniques developed to reach the quality of education of the school building in the stage of primary education,*

Where the architectural design software that can be used in this area, is reviewed and the application of one such software on the case study of the research. This chapter will also tackle the application of statistical program identifies and monitors the underlying problems in school buildings basic problems of education buildings of the primary schools that affect the quality education within such buildings, and analysis of their causes and other techniques which are useful for achieving the objectives of the research.

Chapter VI: *Study the status of a group of schools in primary education in Egypt that have key elements of the standards of education quality assurance,*

but such schools need to be reformed, and schools that do not meet these standards and a comparison between them will also be held, demonstrate the main components of such schools where consist of main components: educational spaces - complementary spaces - administrative spaces - service spaces - yards and playgrounds.

The standards derived from the research will be applied including the rationalization of energy taking into account the standards of education quality taking into account the new teaching methods with assistance and coordination between educational experts and architects to find out the needs and requirements of the users of the educational buildings involving them in the development process, and this represents the trend which not a typical method in dealing with schools and the advancement of the educational process.

Part III: Conclusions and recommendations

Chapter VII: *Conclusions and recommendations for research. It includes the following:*

- Development methodology proposed for the current schools of primary education through finding solutions to the problems the search, and holding a comparison between the system used in schools accredited by the Authority of Education Quality Assurance and the proposed system in the search.
- Program and a curriculum for environmental design proposed to achieve the quality of education in primary education schools, whether the building is existing or for new schools, and includes the methods that can be applied to similar schools.
- Obtaining a code for designing the schools of primary education that conform with the requirements of ensuring the quality of education.

(1) Presidency of the Ministers' Council - The National Authority of Quality Assurance and accreditation in Education - quality assurance standards document and accreditation of the premises of primary schools in the Arab Republic of Egypt -2009 - Egypt.