



Doctoral Thesis

Consideration of primary school design standards with reference to Egyptian schools

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**Consideration
of Primary School Design Standards
with Reference to Egyptian Schools**

DISSERTATION

submitted to the

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for the degree of Doctor of Technical Sciences

Presented by

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CONCLUSIONS AND RECOMMENDATION

In the previous chapters a detailed comparative study of the Egyptian Primary School Buildings has been made taking into consideration the important factors, such as, Educational, Population, Town Planning, Architectural and Technical requirements. As a final conclusion, I would like to state the main recommendation for the planning procedure.

Educational

- The teaching program still in the old traditional way, in which the teacher merely hears lessons in a room with fixed desks.
- . The educational authorities should take into consideration the modern pedagogic requirements and the new trends in education which have already spread through many countries. A research office for this purpose should be established.
- The provision of enough places for all primary school leavers to attend post education is difficult in the present due to social and economical conditions, as a result is the surplus of unskilled manpower in the country.
- . On the assumption that the longer a student in a school the more work he can get through. The primary stage should be extended to 8 years. At the same time the educational program should be modified so that pupils should receive some form of productive tuition. In rural areas primary education should be designed in part to encourage more school leavers to remain in agriculture, rather to go to the cities in search of jobs.

Schools Number

- The admission of all the children within the compulsory education age cannot yet be fulfilled. The percent of those enrolled in primary schools is about 65 % of children in compulsory age.
- . For the realisation of Primary Education a 10 years threefold programme has been proposed including the annual number of classrooms to be provided, the annual increase of teachers as well as the annual increase in Educational Budget.
- . To facilitate the construction of such great schools number (700 school per year), a study including the use of cheap local materials as well as the using of pre fabricated elements should be undertaken by the Bulding Rese-arch Centre in Cairo.

Schools Distribution

- The distribution of school buldings in Egypt is not according to a studied rule. In some districts there are two Primary schools close to each other wheras other districts has no school to serve it.
- . School buldings distribution should be according to a well study of the pop-ulation density, structure and movment. Increase in population in the next 20 years in each Educational Zone should be estimated on a somewhat solid base. The anticipated number of children of school age can be estimated so that arrangments can be made in advance for their accomodation in schools.
- . In desrt districts as well as in areas with low population density some agri-cultural and economical projects should be undertaken. The execution of such projects will provide a strong motive for population to cluster around them which would facilitate the task of proper distribution of educational services to serve the population there.

- . A zoning of the different town areas should be established to determine the residential zones in which the schools should be distributed. Any alternations in the planning should be prohibited by law.
- . Forshighted land policy, In order to secure the ground at the lowest possible cost the reservation of suitable school sites should be made immediately a new district is planned.

School location

- The majority of the Egyptian Primary schools, even the new, are located so that the main access to the school is directly from the main street and this results in danger for the children as well as noise in the classrooms.
- . The school location should be the result of different studies such as. Its relation to the different community elements, putting in mind that this relation is a vital factor affecting the degree of the school success.

Its location with respect to traffic so that children should not have to cross any main road to attend the school. Where ever a frontage to a road carrying heavy traffic is unavoidable, safety barriers must be erected outside all exits likely to be used by the children.

Its location within reasonable walking distance so that a more intimate contact between school and home can be reached. The walking distance recommended should be max 1200 m.

Roads are a source of noise and this is another reason why schools should be sited wherever possible away from busy through fares. Wherever frontage to a noisy road is unavoidable, a well planned landscape outside the classrooms can achive better sound conditions.

Availability of pure water, electricity as well as drainage conditions should be considered, so that, the expense of making lengthy connections to water, electricity and sewers mains can be avoided.

School site area

- From the study of the different school types in Egypt, the site area varies from 1500 m² to 4800 m² which is very small compared with the other countries. The gross area per child in
- | | | | |
|-------------|----|---|-----------------|
| Egypt | 3 | - | 9.6 sq.m. |
| England | | | 70.0 sq.m. |
| Switzerland | 36 | - | 40.0 sq.m. |
| USA | | | 160.0 sq.m. (1) |

The very small site area of the Egyptian school affect the school function to a great extent. To determine the area needed for a primary school, a study centre should be established to take the lead in specifying what activities should take place within the school and the required area for each activity.

The site area should be the area required for the school bulding as well as that for the recreation and play places.

(1) The well-known American expert, Ernest J. Kump, assumes the standard space requirements for a school of 500 children to be 81'000 sq.m. (The New School by Alfred Roth)

The School Bulding

- More than 50 % of Primary schools are hired buldings, and these are below the standard requiered for a school. Moreover about 170 school must be removed for their dangerous condition.
- . I hope that each Educational Zone will start to replace the unsuitable buldings by new schools.

The classroom unit

Area

- The area of the classroom is about 44.0 sq.m. (0.8 sq.m. per child) which is very small compared with that in other countries such as
 - England 2.00 - 2.25 sq.m.
 - USA 2.30 - 3.40 sq.m.
 - Switzerland 2.00 sq.m.
- . The classroom area should be increased at the same time the children number per class should be reduced to 40. The recommended area is 1.7 sq.m. per child as a minimum.

Shape

- The classroom in Egyptian schools is always the rectangular one 8.0 x 5.5m which is suitable only for the formal education.
- . The area, form and size of the classroom should be the result of different studies undertaken by the educator who will specify the different activities which should take place within the classroom, and the educational authorities who will determine the classroom capacity according to the local conditions of each Educational Zone. Then the architect will be in a position to formulate a formal size and shape of the classroom.

Furniture

- Classroom furniture in Egypt still a repetition of yesterday's order because the authorities were not equipped to undertake furniture research and design.
- . The classroom furniture should be designed to suit the different activities and to permit various composition. Chairs and tables should be light, movable and adjustable.

Equipment

- Classrooms in Egyptian Primary schools are equipped only with chalk boards.
- . To meet the different activities and to help children to learn the classroom should be equipped with, display-units, window seats, wall benching as well as a surface which can take pins without deterioration.

Lighting

- A careful study is needed not only to provide enough quantity of day-light which is not a problem in Egypt, but also to attain a good lighting condition which can be reached by a well distribution as well as protection from glare.
- Using Primary schools at night to eradicate illiteracy calls for installation of artificial lighting in all classrooms.

Ventilation

- About 27 % of classrooms have not enough ventilation, whereas 3 % are in bad condition.
 - . To attain the requiered comfort within the classroom, climate conditions such as Temp. R.H., and P.W. which varies according to the Educational Zones should be considered. For each Educational Zone the suitable solution must be provided.
- As happened till now, it is very wrong to design a school type to be built in all the Educational Zones where the climate is completely different.

- Protection from sun**
- In all the Egyptian schools there is no protection of the roof against the direct impact of sunrays.
 - . Local materials to absorb the heat as well as advanced solutions to protect the class room roof from excessive heat must be applied.
 - . The school building should be concentrated to minimize the roof area subjected to the direct sun impact. The type recommended for the hot climate of Egypt is the Inner Court Pattern, having the classrooms facing inwards to a cool shaded area with pools, fountains and greenery.

- Sanitary Accomodation**
- The number of schools which have sanitary accomodation in bad condition is more than 1000. In addition there are about 70 school without any accomodation, represents a very dangerous deficiency.
 - . Every Educational Zone should start to improve the sanitary accomodation in its school buldings.
 - . Those schools which have no accomodation should be provided with temporary units.

- Water Supply**
- The number of schools which have no pure water is more than 100, In addition there are 158 school in which the children must drink direct from the river Nile helping in the transmission of enteric diseases.
 - . I hope that the number of schools which have no pure water will decrease in the near future due to the expansion of the pure water plants in Rural areas. Untill which, local filteration apparatus should be provided in each school.

- Out door space**
- All Primary schools in Egypt have not enough space for out door activities. Moreover there are more than 700 schools (10 % of total Primary schools) have no court at all.
- Even in the new primary schools, the area provided for out-door activities is very small compared with outher countries.

Country	Court	Sport Gr	Lawn	Garden	Total	Child m ²
Egypt	576				576	1.1
	1665	-	-	-	1665	3.3
Switz.	2000	1250	3200	300	6750	13.5
Germ.	1500	1000	3200	250	6000	12.0

- . Primary schools besides administering education should encourage physical fitness. In the event of it being impossible to obtain a site large enough to incorporate a play ground, it is recommended to locate the school near a public play ground or green area where the children can make use of the open air facilities.

- Aesthetical Treatment**
- Landcape. Great attention should be paid to the school surrounding. The providing of a green area would help to a great extent, in creating a cool restful atmosphere.
- Sculptures, murals and reliefs add beauty to the school and can be used to express many educational intrests. Their locations, size and material should be well selected and integrated with the surroundings.
- Finally, a close co-operation between the Adminstrators, the Educator and the Architect is recommended.

SUMMARY IN GERMAN

ZUSAMMENFASSUNG DER ARBEIT AUF DEUTSCH

1. Abschnitt

Im 1. Abschnitt wird der heutige Bildungsstand von Aegypten beschrieben. Dann folgen Angaben über Mittel und Wege, wie diejenigen Bildungsstufen gefördert werden können, die in einem Land mit einer Entwicklung wie Aegypten den Vorrang haben sollten. Hernach werden die Probleme gezeigt, die aus der Bevorzugung der Elementarschulung entstehen können und Vorschläge zu ihrer Lösung gemacht. Daraufhin werden Verbesserungsmöglichkeiten besprochen mit dem Ziel, die vorhandenen Bildungslücken zu schliessen.

2. Abschnitt

Dieser enthält Untersuchungen über die Notwendigkeit, Grösse und Anzahl der Primarschulen, die Aegypten zur Verfügung haben sollte. Dabei sind drei Gesichtspunkte massgebend:

1. Der Bevölkerungszunahme muss Rechnung getragen werden.
2. Erhebungen über die Ausbildungsmöglichkeiten in Vergangenheit und Gegenwart haben gezeigt, dass kaum 65 % der Kinder im Schulalter einer Elementarbildung folgen können. Um eine 100-prozentige Ausbildung gewährleisten zu können, wurde ein Zehnjahresplan aufgestellt, in welchem die Zahl der benötigten Primarschulen und Lehrkräfte sowie die damit verbundenen Baupläne und der gesamte Kostenaufwand berechnet werden.
3. Viele jetzt benutzte Schulen genügen den Anforderungen des heutigen Standards nicht mehr. In einer Analyse wird gezeigt, welche Primarschulen in naher Zukunft ersetzt werden müssen.

3. Abschnitt

In diesem Abschnitt wird versucht, die mit der städtebaulichen Seite der Schulbauten zusammenhängenden Probleme eingehend zu beleuchten. Bei der Verteilung der Schulbauten ist die Wohndichte einer Stadt zu berücksichtigen sowie ihre Grösse und der Prozentsatz der Schulpflichtigen. Die Anlage eines Schulhauses hat auf Verkehrs- und Fabriklärm, Einfügung in andere Siedlungselemente sowie Länge und Art des Schulweges Rücksicht zu nehmen. Der Flächenbedarf hängt von der Art und Grösse des Schulhauses und der Anzahl der Schulräume ab. Diese Fragen muss der Planer in enger Zusammenarbeit mit den Schulbehörden abklären. Das Flächenmass wächst mit zunehmender Auflockerung der Bauanlage, während mehrgeschossige Schulgebäude weniger Gelände brauchen. Bei der Wahl des Baulandes müssen drei Hauptforderungen berücksichtigt werden: Hygiene, Landschaft und Technik.

4. Abschnitt

Der 4. Abschnitt enthält eine vergleichende Uebersicht über die Lage von Primarschulen und deren Schülerzahl in Aegypten und verschiedenen andern Ländern.

5. Abschnitt

Dieser umfasst eine Untersuchung über die verschiedenen Einrichtungen einer Primarschule, die in drei Gruppen eingeteilt werden, nämlich Schulräume, Gemeinschaftsanlagen und Verwaltungsabteilung. Mit besonderer Gründlichkeit wird die Klasseneinheit behandelt: Raum, Grösse, Form, Möbel, Ausstattung, natürliche und künstliche Beleuchtung, Akustik und Ventilation.

6. Abschnitt

Durch Vergleichung verschiedener Schulgebäude wird versucht, das Verhältnis zwischen verfügbarem Schulraum und benötigter Fläche pro Kind zu berechnen.

7. Abschnitt

In diesem Abschnitt werden Vorschläge für die Gestaltung von Primarschulhäusern gemacht.