Primary School Buildings standards, norms and design

The Department of Education
Royal Government of Bhutan

by Jean De Spiegeleer, Architect

UNESCO

TABLE OF CONTENTS

INTRODUCTION

Primary school building in the Kingdom of Bhutan presents a wide spectrum of planning and design problems. Being a mountainous country, the population in the north and the central areas is very scattered. In the southern parts and urban areas, the density is much higher and larger schools are in need.

Many aspects have to be taken into consideration by the designer. The whole country is located in a high risk earthquake zone. The climate changes from cold-temperate in the north to tropical with heavy monsoon in the south. Local building techniques and available materials may include the use of mud walls, stones with mud mortar, wooden structures, bricks with cement mortar or concrete buildings. Local sanitation and personal hygiene practices of peoples vary from place to place. All these factors which influence the design of educational facilities have to be identified by a survey before designing a school for a certain area.

In addition to the great variety of buildings, there is a changing pattern of learning. Whilst for some years, the traditional teacher-centric methods of learning will continue in some schools, with the introduction of the New Approach to Primary Education, a new method of teaching-learning is gradually being adopted. This new pupil-centric method requires different types of school buildings and facilities.

The problem facing the designer is to provide an environment in which the learning process can best be carried out. Mud and timber schools may be good or bad, just as multi-storied concrete schools can be good or bad. It is hoped that the data provided here will be of as much assistance to those who are designing small rural schools as to those who are designing large urban schools. It should be equally applicable for the renovation and expansion of existing schools.

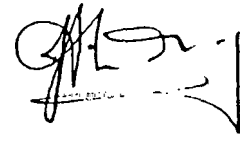
Few architects are specialists in school building. Those in general practice or employed by the Public Works Department are usually responsible for a wide range of building types. Furthermore, standards, norms and regulations for the design of school buildings in the country have not, as yet, been developed. It is necessary therefore to provide a single document which presents in a systematic way the major points relating to the design and the construction of primary school buildings and related facilities.

This booklet is in continuation of the report “Expanding Physical Facilities for Primary Education in Bhutan”. It should be regarded as a check-list and a source of reference. It is intended to provide norms and standards, design samples, facilities requirements and way of estimating building costs. It may be that the educationist and educational administrators (who should always be associated with any building projects) will also find these design guide-lines of interest as it will indicate to them some of the technical problems faced by the designer. They will then be in a position to make best use of the design services to obtain the sort of building most suited to their educational needs.

With the limited material and financial resources, cost limits must impose an exceedingly stringent discipline on both the designer and the educationist. Every square metre of the building must be used for as many hours of the day and days of the year as possible. Unused construction will be a waste of money that might otherwise have been better spent on training another teacher or constructing another school building.

One of the problems is the vast number of children for whom new schools must be provided. In this circumstance, architects will most frequently be concerned with aspects of construction involving repetition. The importance of repetition lies in the avoidance of bad design features that will be repeated many times, In all cases when a design is to be used as a standard for future construction, it is of utmost importance to build and evaluate a prototype component or building before issuing the final drawings for general use.

Thimphu, May 1986



(Jigmi Thinley)
Director of Education

A. EDUCATIONAL BACKGROUND

A6

SCHOOL MANAGEMENT ORGANIZATION

PERIPHERAL SCHOOL

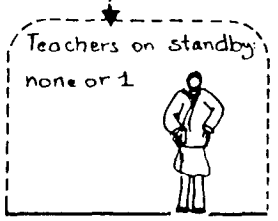
ENROLMENT: 180.... 400

Headmaster

Teachers... 5 to 13

Teacher/student ratio 1:36

Teachers on standby: none or 1

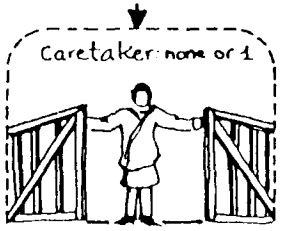


In schools which enrol less than 250 students, the Headmaster replaces absent teachers.

Cooks/caretaker

Minimum 2 cooks, add 1 cook per 60 students above 180 students.

Caretaker: none or 1



If there is no cook.

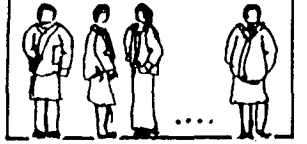
1 Clerck assistant

DEVELOPMENT CENTRE/URBAN SCHOOL

ENROLMENT: 150... 600

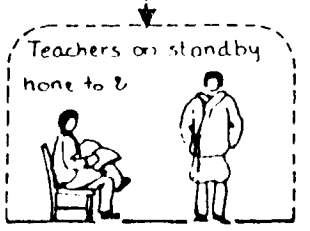
Headmaster

Teachers:... 5 to 19



Teacher/student ratio 1:36

Teachers on standby: none to 2



Same as in Peripheral schools. Above 400 students, 2 teachers are on standby.

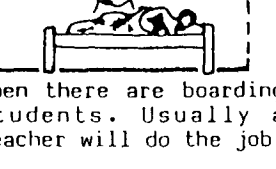
Cooks/caretaker

Minimum 2 cooks, add 1 cook per 60 students above 180 students.

Caretaker: none or 1

If there is no cook.

1 Matron & 1 warden



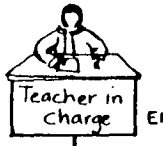
When there are boarding students. Usually a teacher will do the job.

1 clerck assistant

OR..

EXTENDED CLASSROOM

Teacher in Charge



ENROLMENT: 35.... 150

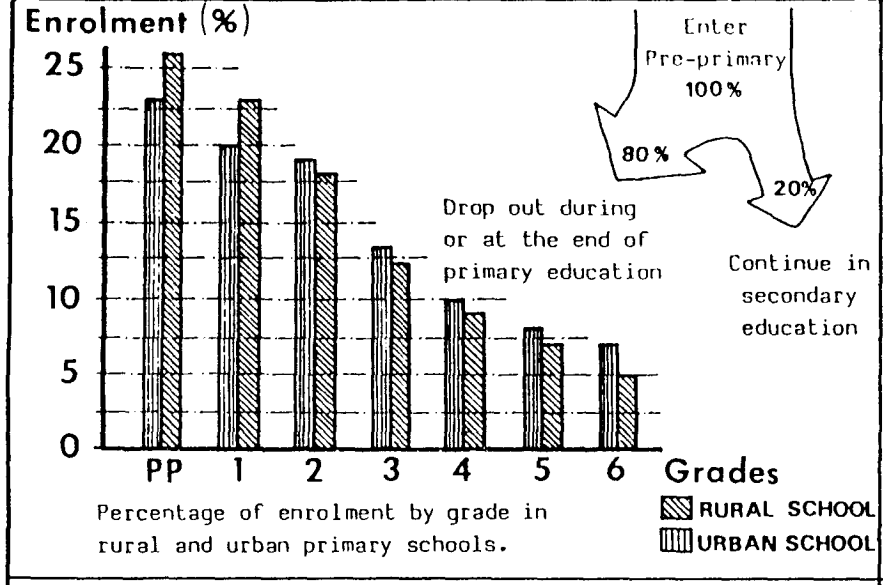
Teachers:... 1 to 5

Teacher:/Student ratio: 1:36

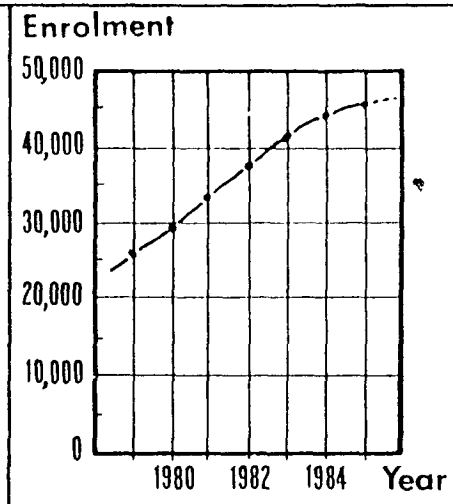
A4

PRIMARY ENROLMENT

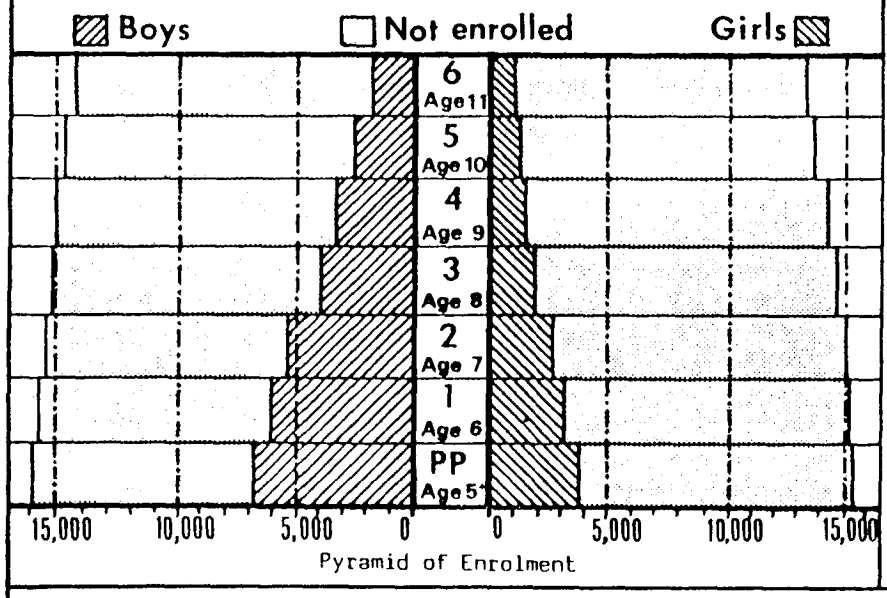
ENROLMENT SITUATION (1985)



Percentage of enrolment by grade in rural and urban primary schools.



Primary Enrolment Growth (79-86)
(Average: 4,000 new places/year)



Pyramid of Enrolment

In 1985 there were about 25% of primary school age children enrolled in primary education: 2/3 were boys, 1/3 were girls.

6th V Year Plan

Need to expand the primary education system by an increased capacity in existing schools and building new schools.

Target for 1987-1992:
Increase by 10% per year or provide between 4,000 to 6,000 places per year.

Note: Primary school children are an average of two years older than the required age.

ENROLMENT & ACCOMODATION

If classrooms were designed to be proportional in area to the numbers of students retained in the school system, they would all need to be of different sizes.

Pre-primary	Class 1	Class 2	Cl. 3	Cl. 4	5	6
26	23	18	12	9	8	7

Example for a 100 student school.

This is certainly the most efficient way to utilize the space. To keep a sufficient flexibility two solutions are proposed.

In rural schools
Where full-sized class groups will never be achieved, provide open hall classrooms with movable partitions to adjust space to enrolment and allow multi-class teaching.

In large schools and urban type schools
Full-sized classrooms varying in numbers for the different grades.

How to calculate school capacity
A detailed study of the population in the catchment area of the school which applied to the typical enrolment by grade will help calculate the size of a new school or the expansion required for an existing school.

The design capacity of the school will be equal to the calculated enrolment increased by 20% to allow the school to expand and to provide flexibility in forming class groups of various sizes.

A2 THE CURRICULUM AND WEEKLY TIMETABLE

THE CURRICULUM

In the Environmental Studies Syllabus (The New Approach to Primary Education), there are four main strands. The emphasis is on learning through participation and active involvement of the children.

The subject Environmental Studies combines geography, history, science and in addition health, arts and crafts and physical education. It has a central focus on agriculture. The topics are the means to enable the child to observe and work with environment around him and to acquire knowledge through personal experience and discovery.

The EVS (Environmental Studies) topic outline

PRE-PRIMARY	CLASS 1	CLASS 2	CLASS 3	CLASS 4	CLASS 5	CLASS 6
Myself and my family	Home	The body	The school	Games for boys and for girls	Farm	Neighbours
My class	What do people do?	My village	Festivals	Different peoples of Bhutan	Rivers and mountains	Planet earth
Flowers	Plants	Vegetables	Fruits	Sickness & health	Sickness + accidents	A commodity
Animals at home	Wild and domestic animals	School livestock	Birds in your area	Acquatic animals	Insects	Trees and orchards
Food we eat	Staple food	Tools	Buildings	Buying and selling	Fire	Energy and work
All around us	Water	Weather	Transport	Roads	Communication	Local Government

Moral education instruction will be taught through all subjects according to guidelines given by the Religious Committee and the Department of Education during morning and evening Prayers/Assembly. The assembly should include the raising of the national flag, prayers and talks on moral and religious issues, as well as other topics.

The weekly timetable is the following:

Course \ Grade	Pre-primary	Classes 1 and 2	Classes 3 to 6
English	6	11	13
Maths	6	7	8
Dzongkha/Nepali	6	6	6
Environ. Studies	12	6	11
Activities	-	5	6
Total No. of periods	30	40	44

THE CLASS SYSTEM

The class system adopted is that one teacher takes a class for all subjects except Dzongkha/Nepali, giving a certain amount of flexibility in timetabling.

Learning begins with class teaching than develops into individual and small group activity. Teachers will be in the role of guides, advisors, catalists, or co-ordinators of learning.

At any time during the study, the children may be involved in a number of activities or working at different stages of the topic. One child may find information from a reference book, while another small group is making a chart or recording, in written form, some observation made. The teacher must be flexible; moving from group to group. The teacher, when a group makes an interesting discovery, may call the attention of the whole class to it and use that moment to teach an important point to the whole class.

Children must feel free to discuss and share their learning and move about the class when necessary.

B. FACILITIES PLANNING AND COST

THE PLANNING PROCESS

B1

A. DIAGNOSIS AND ANALYSIS

INVENTORY

SCHOOL MAP I

RESOURCES

NEEDS

IDENTIFICATION OF PROBLEMS

ALTERNATIVE EDUCATIONAL POLICIES

A. ...

B. ...

C. ...

B. RESEARCH AND DEVELOPMENT

ANTHROPOMETRIC SURVEY

EDUCATIONAL SPECIFIC | FURNITURE EQUIPMENT | SPACE NORMS | COMFORT NORMS | SAFETY NORMS | BUILDING METHODS | COST LIMITS | ENVIRON. CRITERIA

SPACE PLANNING CONCEPTS

DESIGN GUIDELINES (NEW - REMODEL - MAINTAIN)

PROTOTYPES

EVALUATION PROTOTYPES

C. PLANNING

DEVELOPMENT OF MID-TERM PLAN

PRIORITIES — SCHOOL MAP II — FINANCING — ADMINISTR.

NATIONAL POLICIES FOR EDUCATIONAL FACILITIES (RELATE TO MID/LONG TERM EDUCATION PLAN)

REGIONAL PHYSICAL PLANNING

ANNUAL PROGRAMME FOR EDUCATIONAL FACILITIES
- NEW
- REMODEL
- MAINTAIN

D. IMPLEMENTATION

EVALUATE FINAL RESULTS

EXECUTION: NEW, REMODEL, MAINTAIN

EVALUATION OF DESIGNS

ARCHITECTS BRIEF

DESIGN AND COST ESTIMATE

SITE SELECTION

REGIONAL PHYSICAL PLANNING

TOWN PLANNING

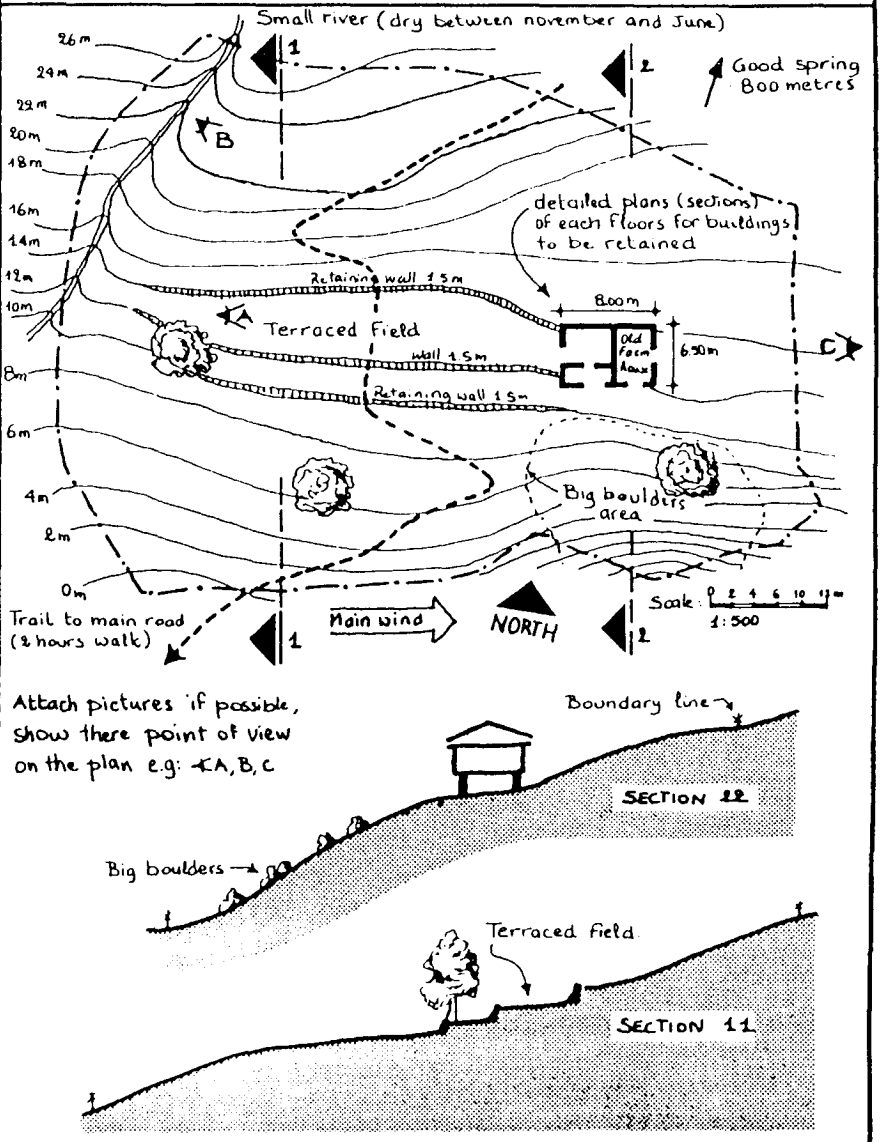
Note: From the El Jack/Almeida model of educational facilities planning and implementation, highlighted boxes show the stages developed in this document. Being a continuous process, it also shows how with the experience acquired, norms, designs and cost limits are continuously updated.

SITE SURVEY

B3

ITEMS	DESCRIPTION
1. Location	District, Gewog, name of the place. * Existence of other schools in the surroundings: primary, junior high, high school (give distance). * Walking distance to the nearest motorable road. * Access road will be made (give expected date).
2. Site plan **Boundaries** **Topography** **Orientation**	Make drawings at 1:500 scale, details at 1:200 scale. * Boundaries of the site with all particulars of the site. * Trees to be retained, current use of the land, ... * Existing buildings (plans, description, use by rooms). * Contour lines at 1 or 2 metre steps. * Sections of the site at interesting locations. * Specify the north on the site plan, the direction of the valley and approximate site location in the valley.
3. Climate	* Local temperature and average rain fall by month. * Existence of strong wind (period and direction). * Altitude of the site.
4. Public services	* Clean water supply (if it does not exist, distance to the nearest spring giving clean water). * Electricity: not existent or to be provided (give date).
5. Local building techniques	* What are the common building types in the surroundings and materials used for there construction? * Available materials locally: give list and cost. * Availability of skilled labour, specify.
6. Population	* Number of family houses in the catchment area. * Average number of children by house. * Distance of groups of houses to the site (give sketch).
7. Sanitation	* Local habits, type of toilet commonly used in the area.
8. Date	* Date of survey.

EXAMPLE OF SITE SURVEY PLAN



Note: The site survey is an important component of the building process as it will provide all the required data to plan a new school or expand an existing one giving expected enrolments, site conditions and type of facilities to be used, allowing the designer to prepare appropriate plans.

EDUCATIONAL BRIEF cont'

11. Schedule of residential accommodation

(a) STUDENTS' HOSTEL

TYPE OF SPACE	No. OF SPACES	AREA PER PLACE (m²)	TOTAL NET AREA (m²)
Boys' dormitory			
Girls' dormitory			
Boys'sick room			
Girls' sick room			
Warden's room			
Matron's room			
Sanitary room for boys			
Sanitary room for girls			

TOTAL STUDENTS' HOSTEL NET AREA : ..... m²
ALLOWANCE FOR CIRCULATION (add 8%): ..... m²
TOTAL STUDENTS' HOSTEL AREA : ..... m² (1)
AREA PER PLACE (area/boarders) : ..... m²/br.

(b) STAFF QUARTERS

TYPE OF QUARTER	No. OF UNIT	AREA PER UNIT (m²)	TOTAL AREA (m²)
Headmaster's			
Teaching staff			
Non-teaching staff			

TOTAL STAFF QUARTERS AREA : ..... m² (2)
TOTAL RESIDENTIAL AREA (1)+(2) : ..... m²

12. Outdoor spaces

TYPE OF FACILITY	No. OF UNITS/PLACES	AREA PER PLACE (m²)	TOTAL AREA (m²)
School buidings			
Residential buildings			
Future expansion			
Assembly/play field			
EVS garden plots		10 m²/section	
Vegetable garden		1-3 m²/user	
Outdoor teaching spaces			
Circulation (add 5%)			

TOTAL SITE AREA (minimale) : ..... m²
AREA PER PLACE (site area/enrol.) : ..... m²/st.

13. Security and protection: fencing, door & window locks (specify)

14. Cost:

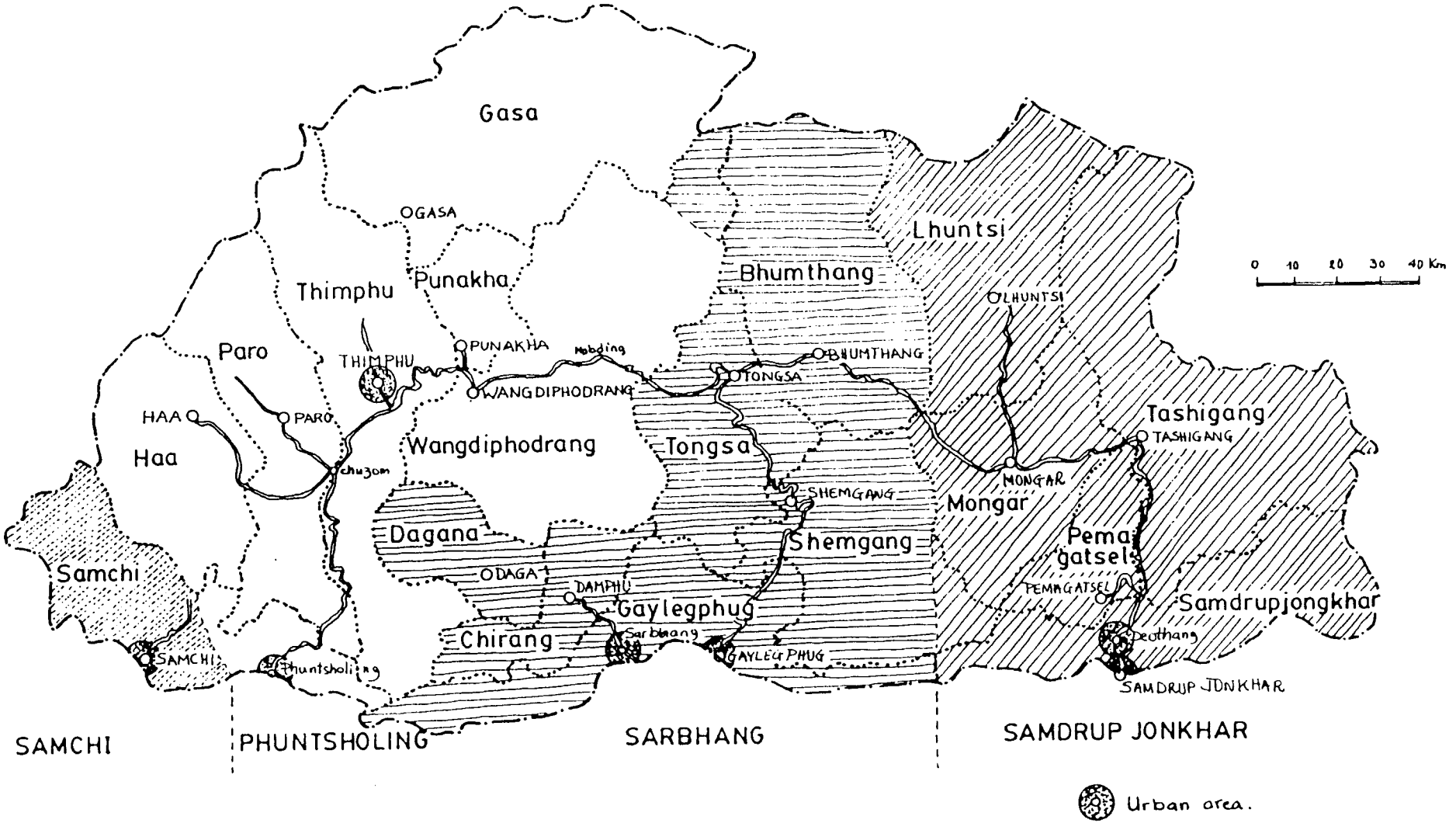
Total budget _____ : ..... Nu.
Cost per place (budget/enrolment): ..... Nu./student

15. Furniture

No.	ROOM TYPE / FURNITURE	Reference No.	Chalkboard	PP table	Sq. desk	Desk & bench	Teacher table	Cupboard	Office desk	Chairs	Table	Shelf	Student bed	Single bed	Double bed	Large stove	Small stove
	TEACHING FACILITIES																
	PP classroom																
	Class 1-3 classroom																
	Class 4-6 classroom																
	_____																
	ADMINISTRATION																
	Headmaster's office																
	Assistant's office																
	Typist's office																
	Stationery store																
	Staff/resource room																
	SERVICE																
	Dining hall																
	Kitchen																
	Dry food store																
	Vegetable store																
	Boys' dormitory																
	Girls' dormitory																
	Sick rooms																
	Warden's room																
	Matron's room																
	HEADMASTER'S QUARTER																
	Sitting/dining																
	Bedroom																
	Kitchen																
	TEACHERS' QUARTERS																
	Sitting/dining																
	Bedroom																
	Kitchen																
	NON-TEACHING STAFF QUARTERS																
	Room																
	Kitchen																
	TOTAL NUMBER																

COST ESTIMATES ZONING MAP

B7



Notes: * Usually, costs in rural areas are 10% above the corresponding urban cost exept for Phuntsholing where a 15% increase should be used.
* Cost estimates for the various zones are given on the opposite page.

C. DESIGN CRITERIA

ANTHROPOMETRICS / DESIGN DIMENSIONS

C1

STANDING HEIGHT (Cm.)

AGE (years)	HEIGHT (cm) MEAN	BOYS	GIRLS
5	101	102	100
6	107	106	107
7	112	111	113
8	116	116	115
9	122	121	122
10	124	122	125
11	130	127	132
12	136	135	136
13	140	141	138
14	147	146	148
15	154	153	152
16	156	157	155
17	159	162	156
18	161	166	156

To suit for the largest number of students while keeping the number of furniture sizes to a minimum, 4 sizes are proposed for primary schools:

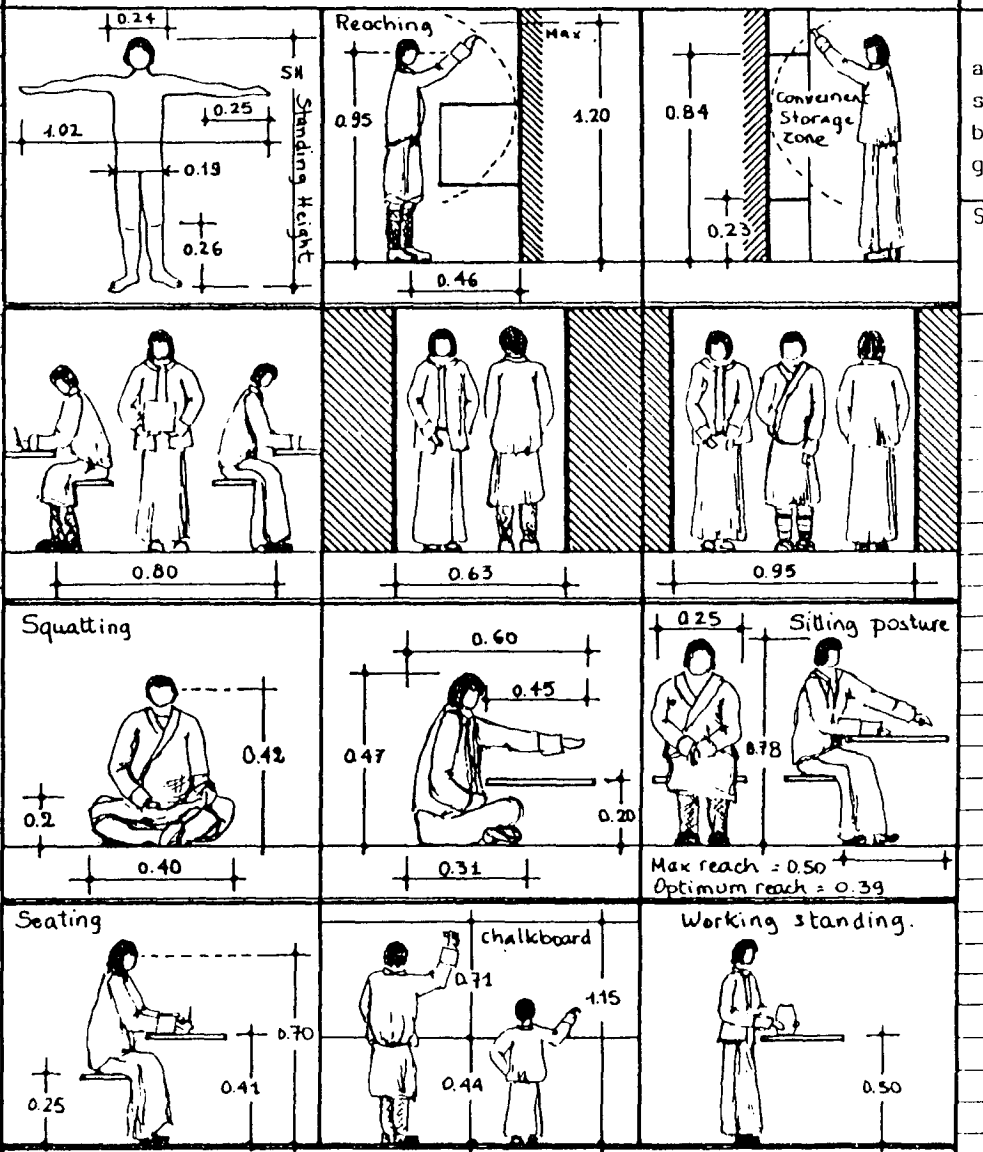
SIZE A: For pre-primary
Av. age = 7 years
Av. SH = 112 cm

SIZE B: For classes 1 to 3
Av. age = 11.5 Years
Av. SH = 132 cm

SIZE C: For classes 4 to 6
Av. age = 14 years
Av. SH = 146 cm

SIZE D: For teachers
Age above 18 years
Av. SH = 161 cm

KEY RATIOS FOR EDUCATIONAL ACTIVITIES



Design dimension = above ratio × SH (Standing Height)

DESIGN DIMENSIONS in Cm.

To provide correct design dimensions and to ensure comfort, the following dimensions are to be used. These are determined by applying the ratios to the different groups also identified as sizes A, B, C & D

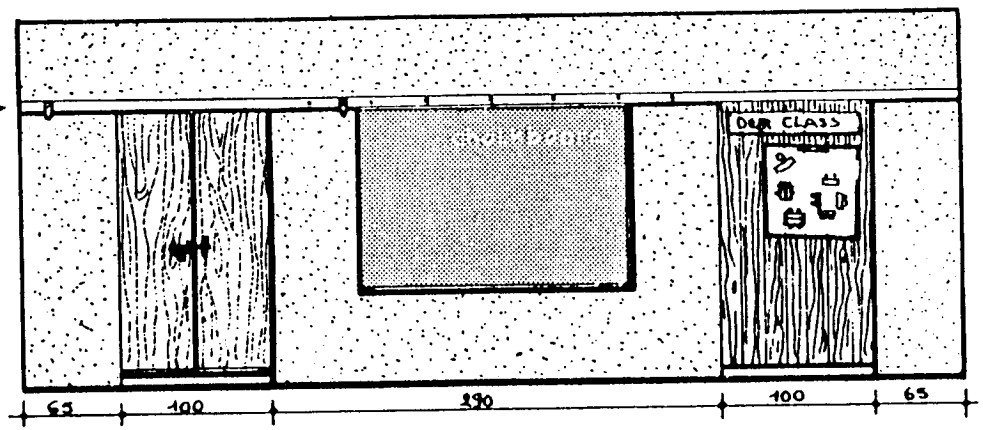
STANDING HEIGHT RATIO	SIZE A SH = 112 (PP)	SIZE B SH = 132 (C1.1-3)	SIZE C SH = 146 (C1.4-6)	SIZE D SH = 161 (Adults)
0.12	13	16	18	19
0.19	21	25	28	31
0.20	22	26	29	32
0.23	26	30	34	37
0.24	27	32	35	39
0.25	28	33	37	40
0.26	29	34	38	42
0.31	35	41	45	50
0.39	44	51	57	63
0.40	45	53	58	64
0.41	46	54	60	66
0.42	47	55	61	68
0.44	49	58	64	71
0.45	51	60	66	73
0.50	56	66	73	81
0.60	67	79	88	97
0.63	71	83	92	102
0.70	78	92	102	113
0.71	80	94	104	115
0.78	87	103	114	126
0.80	90	106	117	129
0.84	94	111	123	135
0.95	107	126	139	153
1.00	112	132	146	161
1.02	114	135	149	164
1.15	129	152	168	185
1.20	134	158	175	193

Note: The furniture sizes proposed are based on the fact that children are an average of 2 years above the required age. Date of survey is May 1985.

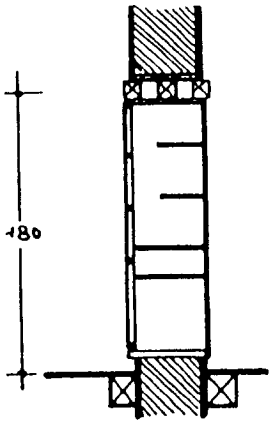
TEACHING WALL DESIGN EXAMPLE

C3

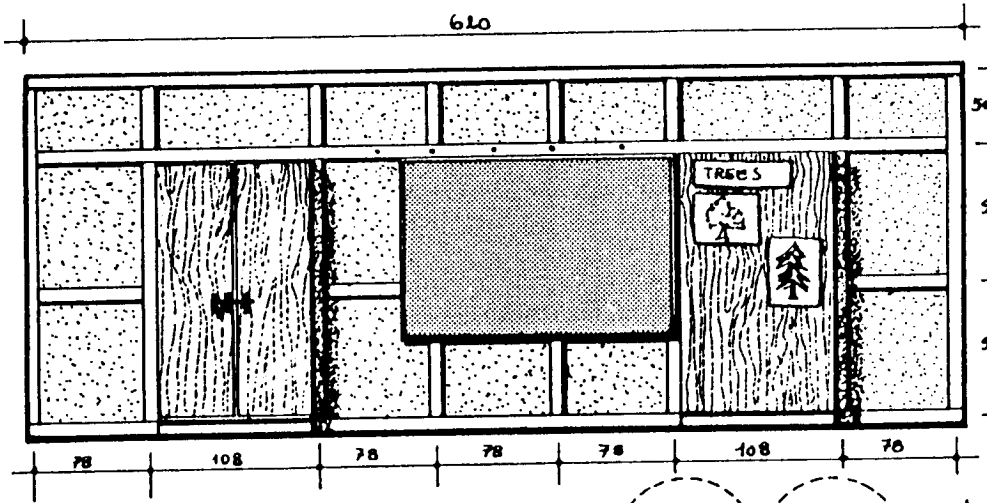
a nailing strip is required at 1.80 m height

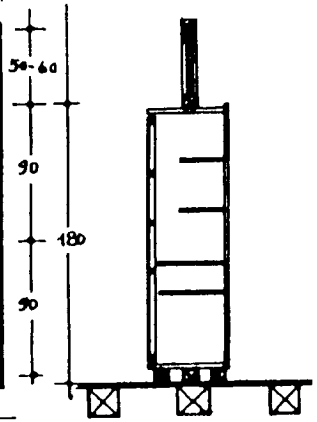


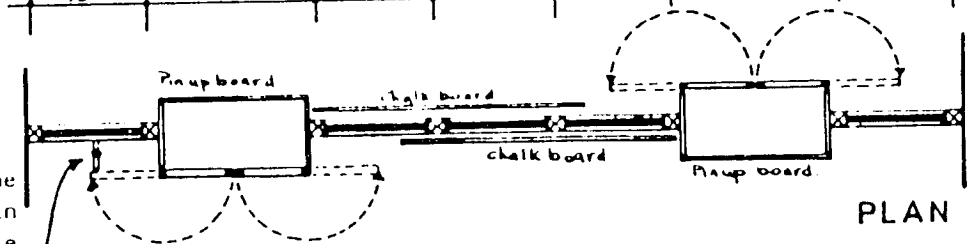
ELEVATION



SECTION







PLAN

To prevent damage to the doors while they remain open, an appropriate support must be provided in case of thin walls.

WALL TYPES

Load bearing

Rammed earth
Stone with mud mortar
Brick with cement mortar
Stone with cement mortar

Partition

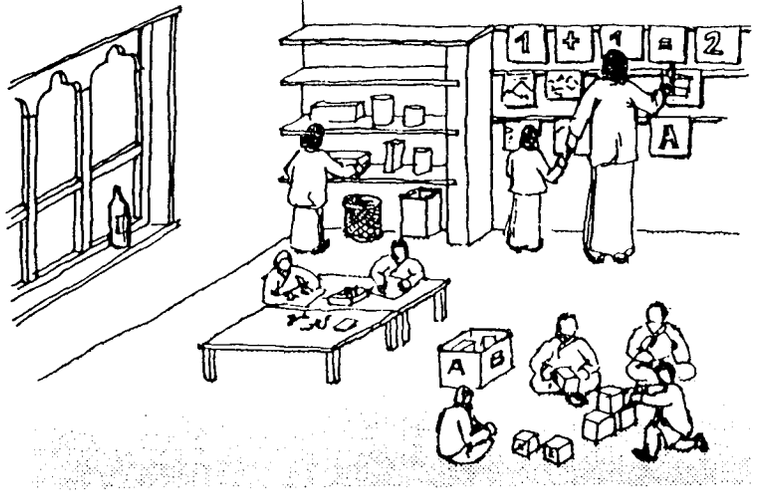
Ekra wall
Hollow block w/cement
Brick with cement mortar

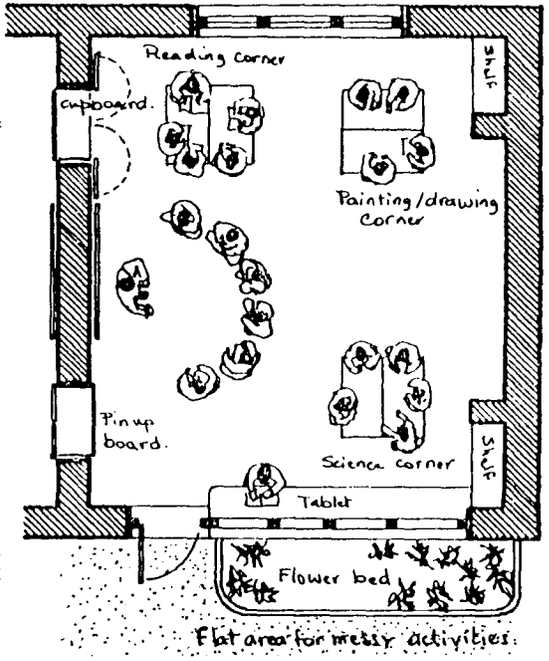
The plan is similar in all cases, only the wall thickness will vary from 10 to 45 cm

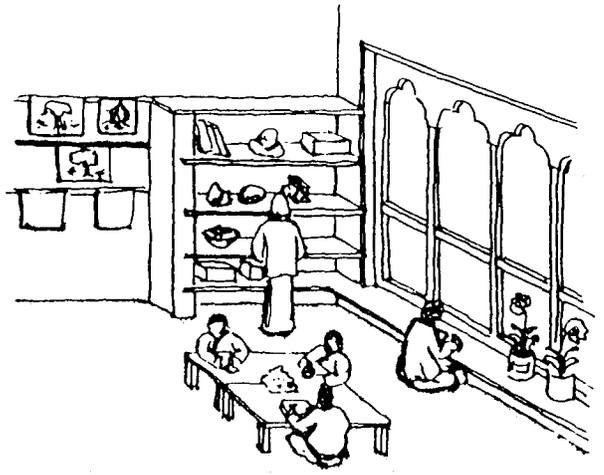
Scale: 1:50

DESIGN IDEAS FOR PRE-PRIMARY CLASSROOM

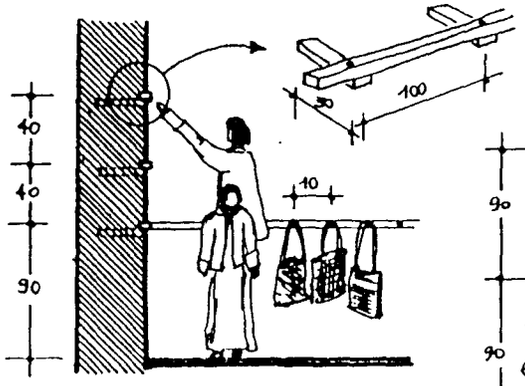
C5



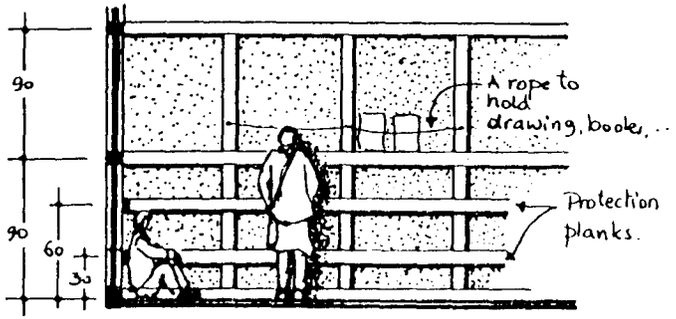




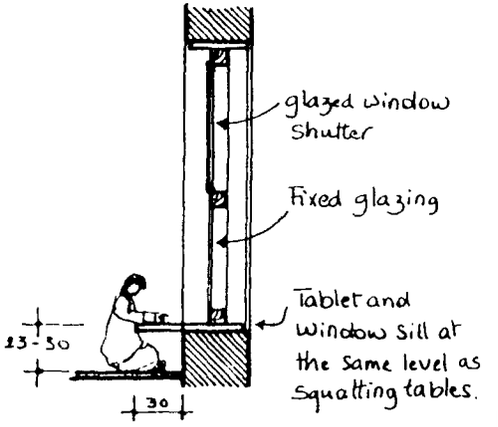
Layout example of a 6.20m x 5.50m classroom



Detail of nailing strips at various heights. The lowest one can also be used by students to hang their personal bags.



Prevent damage by students to ekra walls.



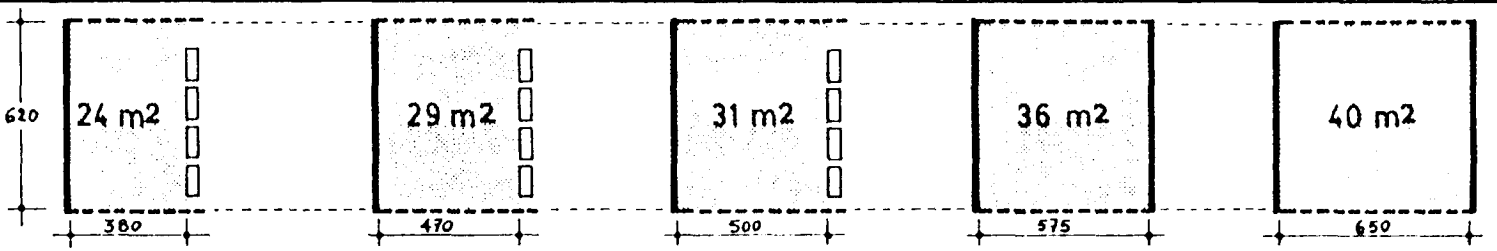
Detail of tablet at window wall.

Notes: * Indoor and outdoor activities being very much related, always locate the primary classroom at ground level.
* To provide as much display space as possible, use nailing strips at various heights and shelves for three dimensional objects. Storage and display of materials is important as it stimulates the children in their work.

SUMMARY OF CLASSROOM SIZES

C7

CLASSROOM SIZES



CLASSROOM TYPE	OPEN HALL CLASSROOM			STANDARD SIZED CLASSROOM	
PRE-PRIMARY CLASS with six seater tables	N/A	Minimum for 36 students 0.81 m²/student	N/A	For 36 students: 1.00 m²/student Up to 48 students: 0.75 m²/student	For 40 students: 1.00 m²/student Up to 48 students: 0.74 m²/student
CLASSES 1 TO 3 with squatting desks	N/A	24 students 1.21 m²/student	32 students 0.97 m²/student	40 students 0.90 m²/student	For 40 students: 1.00 m²/student Up to 48 students: 0.83 m²/student
CLASSES 4 TO 6 with desks and benches	16 students 1.50 m²/student	24 students 1.21 m²/student	N/A	32 students 1.12 m²/student	For 40 students: 1.00 m²/student

NOTES TO THE DESIGNER

The classroom sizes are selected using the school enrolment patterns given in part A using the following rules:

1. In general, the standard full size classroom for 40 students should be used: 6.20 x 5.75 metres or 6.20 x 6.50 metres.

2. Classroom sizes are determined by the size of furniture to be used, the teaching wall set-back and the number of students to accommodate:
   - the width will always be 6.20 metres
   - the length is 2 metres for the teaching wall set-back plus 0.75 m for each row if squatting desks or 0.92 m for each row of desks and benches are used.

3. Always keep the total space built to a minimum. If extra space is provided it must be done using rule No. 2 which will allow for an increase in the class group if necessary.

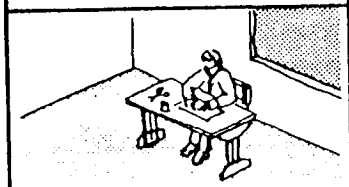
4. The designed capacity of the school will be the required capacity plus 20%. This will allow for an increase in enrolment and give sufficient flexibility in arranging the class groups.

5. Open hall classroom types may be used in small schools where the 40 student class group will never be reached. Such rooms must always group similar classes avoiding some accoustical problems. The sizes of these rooms will be such that they can be divided into standard classrooms if required.

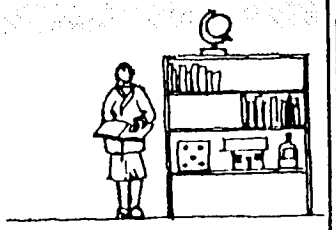
TEACHERS' AND RESOURCE ROOM

C9

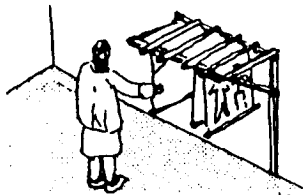
ACTIVITIES



Individual work: prepare a topic, teaching aids, ... often in the classroom

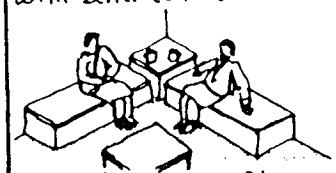


Find information, pictures, ... in books...



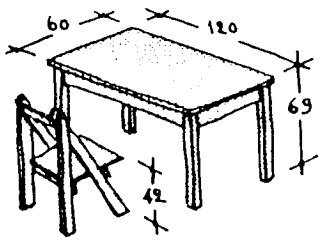
Choose - find appropriate teaching aids.

Meetings and discussions with other teachers



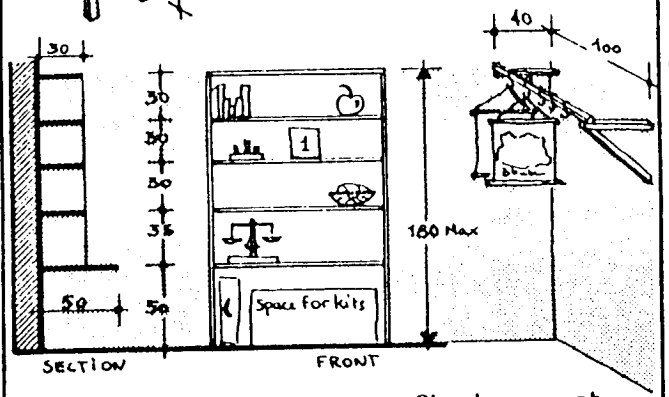
Relax, have a cup of tea...

FURNITURE DESIGN



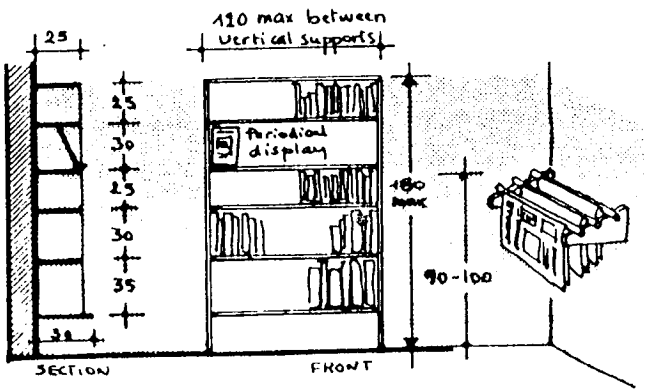
Teacher's table

(in the staff room provide 1 table per 2 or 3 teachers)



Shelf for three dimensional objects

Chart support (1m for 20 to 30 charts)

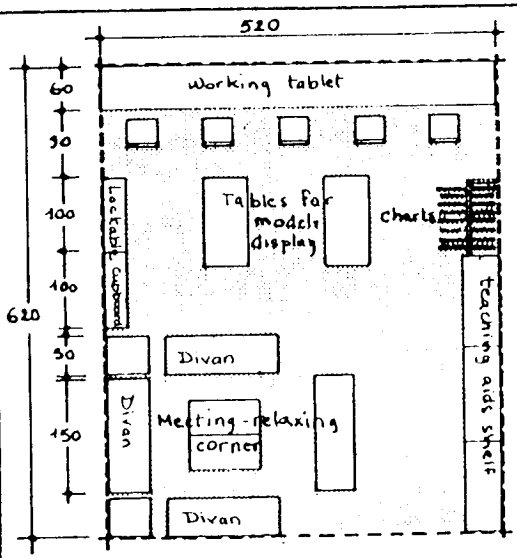


Bookshelf

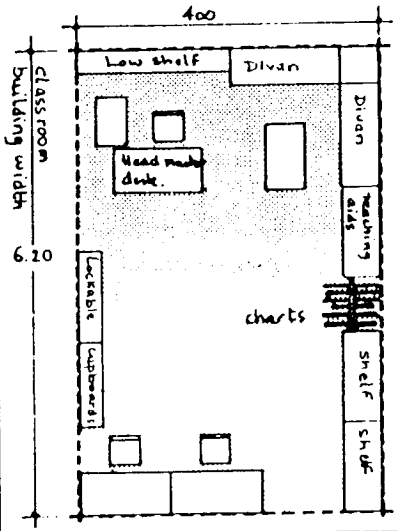
(about 3 reference books/10 cm

Newspaper display

LAYOUT



Staff/resource room (12-15 teachers)
300 - 500 students size: 6.2m x 5.2m = 32 m²



For schools of less than 200 students, the administration, the staffroom and the resource room can be combined.

Size: 4.00m x 6.20m
= 24.80 m²

STANDARDS

For 200 to 300 students: 24 m² (6.2m x 3.9m)

For 300 to 500 students: 32 m² (6.2m x 5.2m)

Above 500 students: 40 m² (6.2m x 6.5m)

This gives an average of: 0.07-0.1 m²/student.

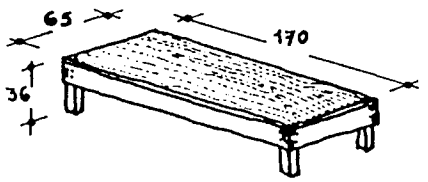
Notes: To promote and facilitate the use of teaching aids, it is better to combine the staffroom with the resource room.
To avoid damage to the materials, it is IMPORTANT to store and display teaching aids properly.

STUDENTS' HOSTEL DESIGN

C 11

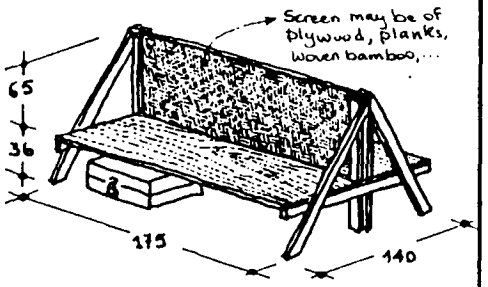
BED DESIGN IDEAS

Beds should have the right sizes, be simple design and strong construction and allow easy cleaning underneath.



Single bed

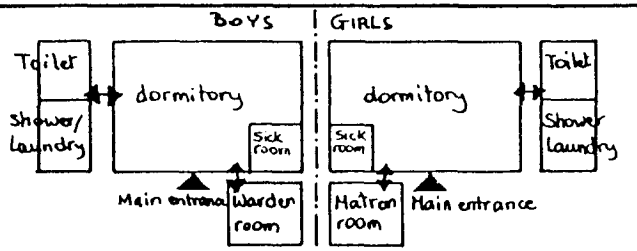
- Lighter to move and easier for cleaning.
- Requires more dormitory space or additional screens between beds must be provided.
- Requires additional space for students individual storage.



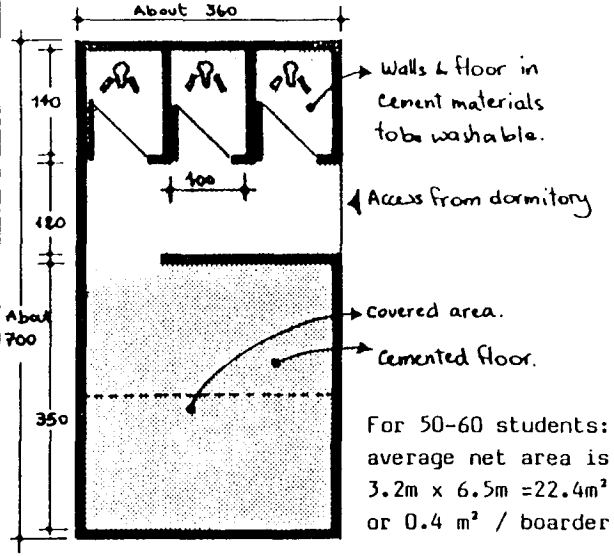
Double bed with screen

- Heavier and not too easy for cleaning.
- "Built in" screen is stronger.
- Allows storage underneath.

LAYOUT EXAMPLES



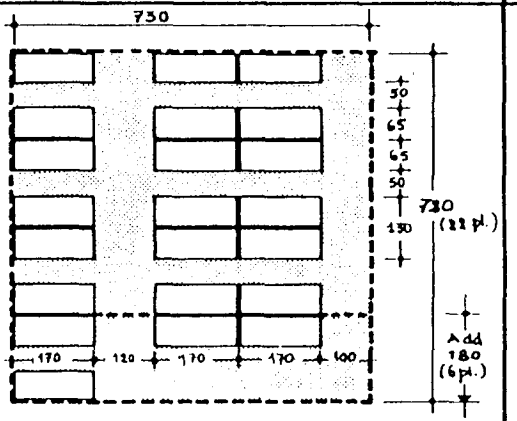
Hostel space relationship



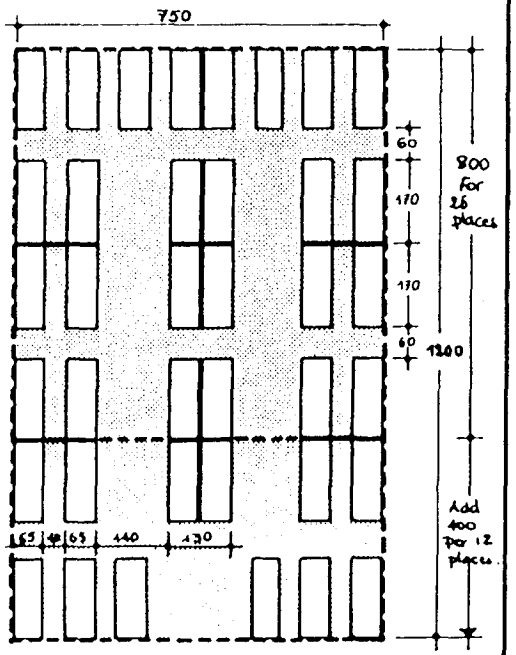
For 50-60 students:
average net area is
3.2m x 6.5m =22.4m²
or 0.4 m² / boarder

Sanitary block example

Toilets must be easily accessible by boarders during the night. In cold areas the shower space will be partly covered allowing boarders to take their shower in the sun. Care must be taken to insure proper water supply and attention given to waste water drainage. If dry latrines are to be used these will be separated from the shower/laundry block.



7.2m x 7.3m =52.6 m² or 2.39 m²/place



7.5 m x 8.0 m =60 m² or 2.30 m²/place
7.5 m x 12 m =80 m² or 2.37 m²/place

STANDARDS

Dormitory space:

2.40 m²/boarder.

Sickroom space:

1 bed/50 boarders
4.00 m² / place.

Shower, laundry and toilets:

Per 20 boarders:
1 toilet
1 shower
Average space is 0.45 m²/boarder

All the facilities will be clearly separated between boys and girls.

Warden and Matron rooms:

9 m² / room with in addition a toilet/shower and a cooking corner.

Note: For safety reasons, dormitory doors should open to outside and never be locked during the night.

BRIEF FOR STAFF QUARTERS

C 13

GENERAL NOTES

* It is necessary to provide suitable living space for teachers of remote schools.

* Living quarters account for a greater area than the teaching space itself. These will often represent more than 50 % of the total school cost.

* The designer should plan quarters as economical as possible while being very functional.

* Not being personal houses, quarters will have to be furnished. From a construction point of view and maintenance requirements, furniture will be as much as possible "built in". Sanitary installations will often be problematic as running water is not always available. In this case, a separate shelter will be provided.

* Knowing that a very large number of staff quarters will have to be built in the coming years, standard designs must be prepared for both tropical and temperate regions. Through standardization, ways of reducing the total cost of each unit have to be investigated. Prototypes should be built, evaluated and improved drawings prepared before building on a large scale.

SCHEDULE OF ACCOMMODATION

Non-teaching staff:
These will include the cooks, the peon and sometimes a caretaker. They are often full-time residents on the site guarding the school during holidays.

- 1 room (used as bedroom, sitting, dining and store): 18 m²
- Kitchen: 9 m²
- Toilet/shower: 4 m²
- Circulation (+15%): 5 m²

TOTAL NET AREA: 36 m²

Teaching staff:
May be married or bachelor. The percentage of bachelor teachers to be considered is 20 %. Teachers reside on the school site only during the academic year.

Married teachers:
- Sitting/dining room (allow for up to 8 persons to eat): 15 m²
- 2 bedrooms: parents: 11 m²
  children: 9 m²
- Toilet/shower: 4 m²
- Kitchen (double smokeless stove) and store: 13 m²
- Circulation (+15%): 8 m²

TOTAL NET AREA: 61 m²

Bachelor teachers:
- Sitting/dining room: 9 m²
- 1 bedroom: 9 m²
- Kitchen (double stove): 9 m²
- Toilet/shower: 4 m²
- Circulation (+15%): 5 m²

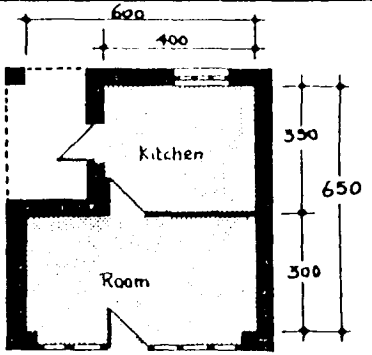
TOTAL NET AREA: 36 m²

Headmaster:
Headmaster's quarter will be given some additional space due to the fact that they are to receive guests or visitors from time to time.

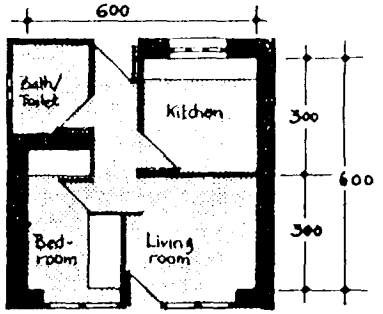
- Sitting/dining room (allow for up to 10 persons to eat): 17 m²
- 3 bedrooms: parents: 11 m²
  children: 9 m²
  guest: 9 m²
- Toilet/shower: 4 m²
- Toilet/shower (for guest): 2 m²
- Kitchen (double smokeless stove) and store: 15 m²
- Circulation (+15%): 10 m²

TOTAL NET AREA: 77 m²

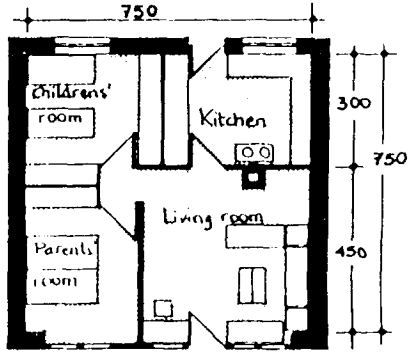
EXAMPLES(Cold areas)



Non-teaching staff quarter
Total net area: 32 m²



Bachelor teacher's quarter
Total net area: 36 m²



Married teacher's quarter
Total net area: 56 m²

PREFACE

In 1985, the Royal Government of Bhutan requested Unesco to provide technical assistance in primary school building design. Under it's Special Account, Unesco approved a two months consultancy with the Following terms of reference:

(a) Develop prototype designs for three primary school types: three hundred, five hundred and seven hundred students, for two climatic zones: warm and cold;

(b) Develop prototype designs of teachers' quarters;

(c) Develop designs of simple furniture for rural schools.

The consultant, Mr. De Spiegeleer is an architect from Belgium who has worked with Unesco Bangkok as an associate expert and concentrated on development of standards for primary schools and teacher training institutions in Asia and the Pacific region.

The consultant took up duty in the field on 12 March 1986 and remaind until 14 May 1986.

In view of the recent developments and changes in the educational policy adopted for the Six Five Year Plan (1987-1991) and the Government will to set up standards for primary school building which would improve their quality and make easier the planning of construction programmes, the terms of reference were reviewed and modified as follows:

Develop a technical Design Guideline/Workbook for the design of primary schools and specifically:

(a) Elaborate standards and norms for the design of primary school buildings which will suit for the newly introduced curriculum.

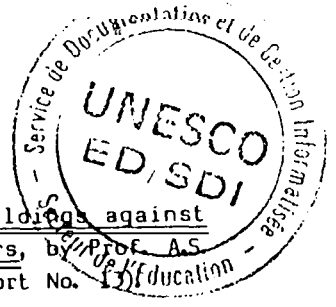
(b) Develop prototype building modules which combined in various ways can suit for schools of different capacities and changing site conditions.

(c) Study alternative building methods to ensure that buildings will be long lasting and adapted to the various climatic zones while keeping the cost as low as possible.

(d) Develop standards and norms for non-teaching spaces including school administration, teacher quarters, students' hostel and dining facilities.

This booklet is the result of the mission. It is a first attempt to establish primary school building standards and norms for Bhutan. While covering most aspects of the design of primary education institutions aspects including buildings, site development and furniture, it is not complete. Therefor this document will need to be updated from time to time to keep up with the rapid developments in Bhutan and incorporating the experience acquired trough the application of the various recommendations given

FURTHER READING



1. Asian Regional Institute For School Building Research, School building design Asia, Colombo, 1972.

2. National Urban Development Corporation, Manual For timber engineering design, by G.S. Rae, Bhutan 1985 (NUDC/002/1985).

3. _____, Manual passive solar energy in Bhutan, by Bruno Erat, Bhutan, 1985 (NUDC/005/1985).

4. _____, Timber roof trusses, Bhutan, 1958 (NUDC/007/1985).

5. Unesco. Regional Office For Education in Asia and the Pacific, Bangkok. Small buildings in earthquake areas, by D. Mooij, Bangkok, 1973 (Educational Building Digest No. 2).

6. _ _ " School libraries, Bangkok, 1975, (Educational Building Digest No. 6)

7. _____. _____. Design for outdoor learning, Bangkok, 1978 (Educational Building Digest No. 11).

8. . . Design guide for student housing, Bangkok, 1978 (Educational Building Digest No. 13).

9. _____. _____. Designing primary teacher institutions, Bangkok, 1985 (Educational Building Digest No. 15).

10. _____. _____. Design ideas for pre-school centres, Bangkok, 1984 (Educational Building Digest No. 17).

11. _ " _ " Anthropometric data and its use for educational building and furniture design, by Evelyn Tan Guat-Lin, Bangkok, 1984 (Educational Building Digest No. 18).

12. _____. _____. Protection of educational buildings against earthquake: A manual for designers and builders, by Prof. A.S. Arya, Bangkok, 1987 (Educational Building Report No. 12).

13. _" _" A primary school design workbook for humid Asia, by O.J. Vickery, Bangkok, 1966 (Occasional Papers: School Building No. 12).

14. __ " __. Classroom furniture, technical notes, Bangkok, 1983 (Educational Building Documents Reprint Series No. 2).

15. _ " _. Expanding physical facilities for primary edu-Cation i Bhutan, Bangkok, 1985 (Educational Building Occasional Paper No. 3).

16. Unesco. School furniture handbook, Volume 1: General and specific aspects, Paris, 1979 (Educational Buildings and Equipment).

17. . School furniture handbook, Volume 2: Practical examples and illustrations, Paris, 1979 (Educational Buildings and Equipments).

18. _____. Handbook For Educational Buildings Planning, by Rodolfo Almeida, Paris, 1985 (Note, comments, . . . (child, family, community) Digest No. 11).

19. Sahayogi press. A cooking place for large-sized pots, by Andreas Bachmann & Thondup D. Kongtsa, Kathmandu, 1984.

20. . Less smoky rooms, by Andreas Bachmann, Kathmandu, 1984.