

# **BUILDING CHILDREN'S SCHOOLS**

## **Transforming the Learning Environment**

**Volume II**

**The Gansu Basic Education Project Experience and Beyond**

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CHINA / U.K.

1999-2005

**Gansu Provincial Education Department**

Cambridge Education

GANSU BASIC EDUCATION PROJECT

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## 6. SCHOOL LOCATION PLANNING

In tandem with the civil works programme, GBEP has developed a systematic and objective approach to school location planning. The innovative features of school location planning, introduced by GBEP, include: the use of a locally developed objective formula for deciding on how to prioritise needy schools, thereby reducing interference of non-technical persons; agreeing on the appropriate factors and weighting to be used (e.g. remoteness, degree of dangerous buildings, number of children out of school etc.); and using this data, combined with judgement, to select schools for support in a transparent manner.

The approach adopted by GBEP to school location planning is replicable and, because of its potential to target limited resources to areas of greatest need, it is one that is worthy of further dissemination. **Annex 1** provides a copy of the detailed step-by-step technical guidance, in support of school location planning, developed by the project.



## 7. MAINTENANCE OF BUILDINGS

GBEP experience in relation to preventative maintenance has yielded some useful lessons of potential wider relevance. These lessons are shared in this Chapter. Additionally, some other insights and resources relating to best international practice are shared to encourage policy makers, planners and practitioners to try to achieve even more in this important area. Practical ideas and methodologies are presented that could help to offer solutions or stimulate additional ideas.

It is worth reminding ourselves why preventative maintenance is so important. Preventative maintenance involves some costs. But, over time, it is likely to be heavily cost saving. Preventative maintenance helps buildings to last longer. It postpones the time when expensive replacements will be required. Timely preventative and remedial maintenance also means that minor defects can be repaired quickly and cheaply before they develop into bigger problems that are far more expensive to rectify.

It is also worth stressing that prospects for effective preventative maintenance are strongly influenced at the design stage of a civil works programme:

The design of facilities should take into account both the building materials available locally and the skills of local artisans. The use of appropriate local materials will reduce both the cost and assist the community to identify with the finished building and help with their repair and maintenance. The use of familiar techniques should also reduce costs and simplify maintenance.<sup>1</sup>

One way to ensure that these considerations are taken into account is through a systematic surveys, which result in "Resource Mapping". These surveys can help to establish what materials and construction techniques are available. They can also help to determine the availability of local architects, engineers and trades-persons with relevant experience and local knowledge.

The GBEP has been sensitive to these principles in its approach to school construction.

It is helpful to identify three types of maintenance:

- **Day to day housekeeping:** which can easily be the responsibility of teachers and students. This includes things like sweeping of classrooms, cleaning of toilets, clearing leaves from drains, etc.
- **Cyclic preventative maintenance:** such as the regular painting of windows and doors, checking and securing loose or dislodged roof tiles, oiling of hinges on doors
- **Prompt repair of specific faults and problems, as they occur:** from broken windows, to dripping taps, to cracks in walls.

International experience suggests that it is reasonable to allocate somewhere between 0.5% and 2% of the initial capital costs of civil works construction for maintenance every year.

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<sup>1</sup> RICE, David; SIBBONS, Mo; SMAWFIELD, David; and WAKEHAM, Nigel (2001) *Report of a Scoping Study on the Contribution of Engineering and Planning to Education Strategies* (London, DFID).

The following is useful guidance on the practicalities of putting some of these principles into practice:

In developing countries, finding funding for maintenance can be very difficult and this budget, if it exists, is usually the first one to be cut in times of economic hardship. Involving local communities in the ownership and maintenance of educational facilities can be very important in reducing the cost of maintenance and in ensuring that the buildings have a long and productive life. Community participation can take the form of raising funds to cover maintenance costs or the provision of labour and materials. This involvement is likely to give the community more interest in, and ownership of, the facilities and thus responsibility for maintaining them. If the communities accept this, then training in maintenance - for both school staff and communities - should be built into the project together with the production of simple maintenance handbooks for use by both the schools and communities. One of the problems in school or community participation in maintenance is that people unqualified in dealing with technical problems will often carry it out.

As part of the move towards school-based management, therefore, maintenance, however funded, should be made the responsibility of the school and through the school, the community. All schools should receive a basic maintenance budget (supplemented by the community if possible) and it should be the school's responsibility as to how this is spent. School staff (and pupils) and communities should receive basic training in maintenance and should be supplied with maintenance manuals. Procedures should be set up for dealing with maintenance problems outside of the capabilities of the staff or community by using, for instance, local artisans, and of reporting major problems to the education authorities.<sup>1</sup>

Central to the GBEP approach has been linking school maintenance issues and needs with the school development planning process. The formatted manuals, which GBEP schools have used to prepare their school development plans, include tables on the subject of school maintenance. These tables assist the process of forward planning, identifying problems and time-bound solutions and actions plans. The participative nature of the school development planning process also makes it far more likely that the communities served by the school will themselves join in both monitoring and supporting school maintenance activity. The left-hand photograph below shows a page from a school development plan in which a preventative maintenance action plan is mapped out.

目标	措施与任务	开始日期	负责人	完成情况
1. 校舍维修	校舍维修工程	2005.7	校长	
2. 校舍加固	校舍加固工程	2005.8	副校长	
3. 校舍粉刷	校舍粉刷工程	2005.9	副校长	
4. 校舍绿化	校舍绿化工程	2005.10	副校长	

A table within the formatted GBEP School Development Plan booklet, which assists in the formulation of a plan for maintenance of buildings.



Public Accountability: This school has announced to the whole community, on a public noticeboard, the maintenance actions it is intending to take: an example of excellent practice.

<sup>1</sup> RICE, David; SIBBONS, Mo; SMAWFIELD, David; and WAKEHAM, Nigel (2001) *Report of a Scoping Study on the Contribution of Engineering and Planning to Education Strategies* (London, DFID).

A GBEP school, under its own initiative, instituted such a system of "public accountability". The maintenance action plans, including financial commitments, drawn up by the school are publicly stated on a classroom gable-end notice board. (See the right hand photograph on the previous page). According to the school's head teacher: "I now have to fulfil these promised actions, "otherwise I shall be in trouble with the community!"

This practice is highly commended. It is something that policy makers and senior managers might wish to consider institutionalising. Perhaps, a permanent, painted, school maintenance grid could become a requirement on a gable-end notice board of all schools. Schools could be required to enter in chalk their maintenance commitments for the forthcoming months, which the whole community can see and hold accountable.

Practical Maintenance Manuals and Guidelines can have an important role to play in creating and supporting an effective maintenance programme.

**Annex 5** identifies some useful international resources of this kind, suitable for adaptation, which may save the task of developing a manual from scratch.

## **8. OTHER GBEP INTERVENTIONS OF WIDER RELEVANCE**

Within GBEP, a number of additional innovations and interventions were included that (a) made a contribution to enhancing the learning environment; and (b) have potential wider relevance for policy makers and practitioners elsewhere. These are highlighted briefly in this Chapter and relate to the following:

- Classroom Features
- Ancillary Rooms
- Dormitories
- Bunk Beds
- Hygiene and Sanitation
- Solar Heaters
- Lighting
- Access Features

Each of these is introduced in turn.

### **8.1 Classroom Features**

A number of GBEP classroom features, such as the provision of furniture and materials, and storage and display considerations, have been discussed in detail in earlier chapters in view of their wider relevance and their major importance for enhancing the learning environment. Three further interventions are worth mentioning here: innovations relating to the size of

windows; the provision of a second blackboard; and findings in relation to the provision of a classroom plinth.

### 8.1.1 Windows



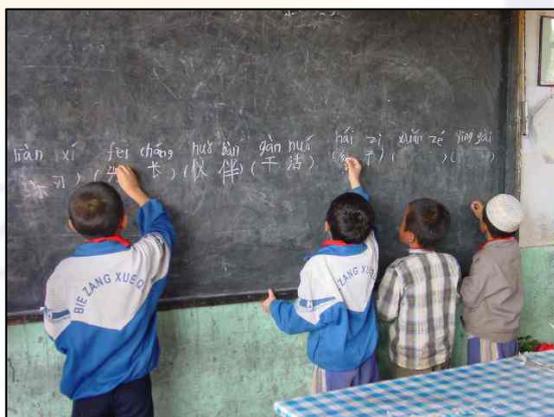
The standard window design



The larger windows in GBEP classrooms

In GBEP classrooms changes were made to the standard sizes of windows. South facing walls of classrooms have large windows to absorb as much warmth and light as possible. North facing walls of classrooms have smaller windows to ensure adequate lighting but minimal heat loss. The larger windows have created a much brighter learning environment. Teachers have been universal in their appreciation of this improvement.

### 8.1.2 Blackboards



Examples of excellent blackboard use. The blackboard shown on the left is a front blackboard. The blackboard shown on the right is a rear blackboard.

Under GBEP, blackboards have been placed at both the front and the rear of the classroom to increase the teaching-aid and display areas for teachers. The front blackboard is at a lower height to enable students to use the blackboard. These are excellent innovations and have been met with enormous enthusiasm in the field.

Under GBEP, the blackboard at the rear of the classroom has been promoted as a display resource. It also has potential to support multi-grade, multi-level and group teaching, as discussed in Annex 2.

### 8.1.3 Plinths

The "plinth" is a raised concrete/brick platform at the front of the classroom, below the front blackboard. (See the photograph to the right). Its primary purpose is to allow an extra elevation of the blackboard - so that children at the back of the room can see the blackboard clearly - while, at the same time, enabling children to come to the front of the class and write on the elevated blackboard, without difficulty. The plinth also creates greater visibility of, and for, the teacher during formal blackboard teaching. The plinth also has the potential to be used as a "stage" for role play and other educational purposes. The plinth, as designed by GBEP, also incorporates a wider area for the accommodation of the teacher's desk: again, offering good visibility for the teacher, of the class, from this position.



The GBEP classroom plinth. Note the extra width created for accommodation of the teacher's desk.

These are all positive considerations. And the advantages of the plinth may outweigh any disadvantages. However, there are possible negative considerations that are worth highlighting. The GBEP plinth reinforces traditional, didactic, teaching methodologies: placing the teacher very firmly at the front of the class, in a position of authority. Among other things, the provision of a plinth seems to be saying that the best position for the teacher is necessarily at the front of the class: which may not be the case, as discussed in Annex 2.

There is also the consideration that there is a cost factor involved in the provision of a plinth. A number of GBEP classrooms were provided with a plinth, but no storage or display shelf facilities. During a review of the GBEP hardware component, the reviewers put to some teachers the following hypothetical scenario. "Imagine there is a pile of bricks in front of you. We could use these bricks **either** to build you a classroom plinth; **or**, to build you some display/storage facility. Which would you rather have?" In all cases, given such a choice, teachers said it would be better if the bricks were used to build a cupboard or shelving.

GBEP built several sizes of classrooms, the reviewers concluded that in classrooms that are not greater than 6.6 metres in length, and where blackboard visibility issues from the back of the classroom are not so acute, the plinth may be an unnecessary feature, where any advantages of provision are outweighed by the potential weaknesses and disadvantages outlined above. Furthermore, the cost of the plinth could possibly be put to better use. In classrooms of 9 metres length, or greater, the arguments for providing a plinth may be much stronger. However, a more modest, cost-effective, and flexible, solution could also be the provision and use of a portable platform, say one metre square and 15cm in height, that could be used when necessary, but also moved into another position, or stored away, when more appropriate.

## 8.2 Ancillary Rooms

One ancillary room was provided as part of the hardware component for each GBEP new-build school and as part of most refurbishments. All ancillary rooms were provided with a blackboard and a raised plinth at one end so that the room could be used for teaching as well as other functions.

The Ancillary room was provided as a general purpose room to be used entirely at the school's discretion, according to needs and priorities and as a way of contributing to the general enhancement of the way the school functions as a learning environment.



A typical GBEP Ancillary Room.

Experience has confirmed that ancillary rooms have proved a useful resource. In many schools, ancillary rooms are used in a multi-functional way: serving flexibly, for example, as libraries, equipment stores, and meeting and display rooms. However, there also seemed to be quite a strong correlation between the extent to which Ancillary rooms are used to their maximum potential and whether or not the school had formulated a clear plan for **how** the Ancillary room is used - including, where appropriate, a timetable specifying **who** should be using the room, and **when**. It may be important, therefore, for manager, inspectors, or other education officials, to encourage schools to formulate and try to keep to usage timetables for Ancillary rooms where this would be appropriate.

## 8.3 Dormitories

The GBEP constructed single-storey dormitories for teachers, on school sites, with an understanding that priority should be given to their use by female teachers. Typically, each dormitory facility is shared by two teachers, and also functions as a staffroom/office.

It was believed that the provision of dormitories for teachers would significantly raise the living conditions of teachers - increasing their morale and motivation and also the likelihood that they would remain and stay committed to the school. It was also anticipated that a happier teacher would be a better teacher. All of these factors, therefore, have the potential to impact upon learning.



A typical GBEP teacher dormitory, shared by two teachers. Note the desk and how the dormitory functions as a staffroom/office.

Many Gansu schools are remote and teachers often have to travel long distances when no accommodation is available to them at the school. This has implications for teacher attendance

and punctuality as well as motivation. Furthermore, the security issue associated with long distance travel is also an important factor for the recruitment and retention of women teachers. Enhancing dormitory provision was seen as an important mechanism for making it easier to recruit and keep women teachers. This was not only an equity consideration with regard to teachers themselves, but female teachers are potentially an important role model for attracting and retaining more girls in school.

The provision of teacher dormitories has proved very popular and appears to have had a big impact on teacher recruitment and retention and girls enrolment. It may well have relevance as an educational strategy elsewhere, therefore.

#### 8.4 Bunk Beds

The GBEP provided bunk beds for girls in some Junior Middle Schools in return for exemption of charges for those girls. These schools attract their students from wide catchment areas. The need of some students to travel long distances has implications for retention and attendance. Children who are exhausted from travelling may also be in a less-fit condition to learn. The situation is even more acute for girls because of cultural and security concerns. The provision of bunk beds allows girls who travel long distances to stay at the school during the week and to return to their homes at weekends.

The long-term effectiveness of such an intervention still needs to be vigorously appraised. However, the project has gathered some evidence that, where properly targeted, the provision of bunk beds for girls may indeed be a valuable strategy for achieving greater girls' enrolment and retention at the Junior Middle School level in remote areas. Again, this GBEP project experience may be of wider international relevance and help to provoke experimental innovation elsewhere.

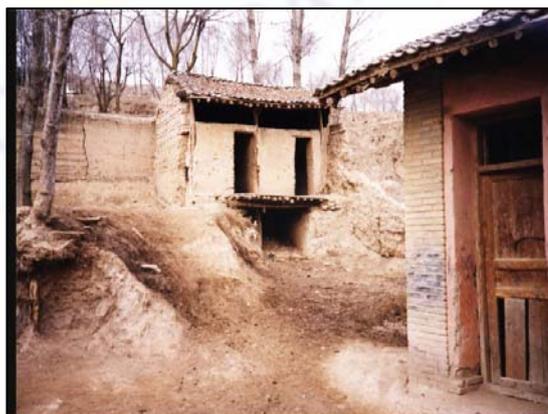


Project bunk beds in a girls' dormitory in a Junior Middle School in Jishishan County

#### 8.5 Toilets

The photograph on the right shows the kind and condition of latrine found in many schools in Gansu before GBEP. The traditional latrine design is "open pit". It has "high maintenance" requirements, in the sense that open waste needs regularly to be covered with a layer of soil to reduce smells, flies, and risk of disease.

In GBEP schools, ventilated dry pit latrines were provided at a ratio of approx 1 - 20/ 25 students.

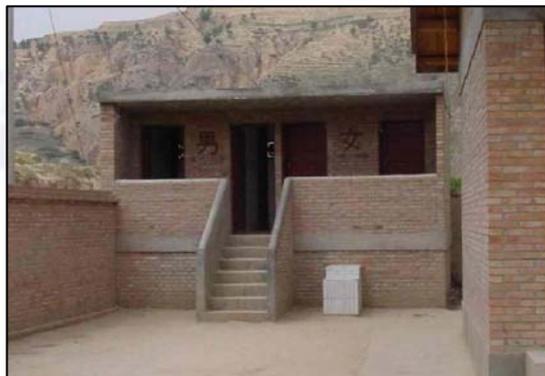


A pre-project latrine

The provision of latrines was conceived as part of a whole-design package aimed at making schools higher quality and more-comfortable environments for both students and teachers: with anticipated knock-on effects for retention, motivation, and learning.

The GBEP design solution was intended as an improvement to the traditional latrine. The soil pit, incorporating a pipe to take away smells, is an enclosed pit: with the primary purpose of reducing the possibilities for flies to enter, breed and spread disease.

The provision of latrines under GBEP has also been linked to programmes designed to raise awareness and improve practices in relation to sanitation, health, and the environment (See Section 8.7 below).



A typical project latrine. Note, in this example, the incorporation into the boundary wall, to save bricks. The white tile plinth is intended for washing facilities. - not in evidence in this school (See Section 8.7 below).

This new approach has yielded a lot of learning. In some areas the latrines have worked well. In other areas, with different climatic conditions, the need for further modifications to the design has been exposed. There have also been cultural issues to complicate matters. Some farmers have found the neat waste obtained from closed pit latrines far less acceptable as fertiliser, compared to waste that has been mixed with soil - obtained from open latrines.

Despite these setbacks, it is the creation and encouragement of a willingness to experiment and learn lessons that has been one of GBEP's greatest achievements across all areas of the project. Civil works personnel in project counties are now far more open to new ideas and many continue to be actively engaged in further experimentation, under their own initiative, to find even better solutions.

## 8.6 Water Supply

In GPEP counties, school water supply has been a long-standing difficulty due to the arid nature of the environment. In some counties the problem is more extreme than others.

Water is required for basic human needs of drinking and washing - by the children themselves and the teachers living at the school. Increased water availability creates the scope to clean schools more effectively and also to beautify them through the planting and watering of trees and flowers. It also creates the possibility to introduce or develop vegetable gardens. Increased water availability can also have direct



A ground water storage tank - for collecting rain water from classroom roofs.

impact on classroom practice - for example by making painting possible as part of art-work, and allowing science experiments using water. All of these considerations can combine to create more child-friendly schools and to enhance the learning environment.

Consequently, the project introduced or improved water supply systems to schools. Different technical solutions were provided according to differing geo-technical conditions. These solutions ranged from the use of spring water, wells, the provision of water butts (in the form of underground storage tanks), and laying piping to schools from an existing nearby water system. In many cases a complete solution has been offered. In some other instances, because of extreme aridness, project interventions have alleviated water shortages but not completely solved them.

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## 8.7 Health, Hygiene and Environment

The GBEP has consolidated the provision of various items of hardware, such as latrines and water supply by developing policies and training modules to promote good practice and a better understanding of the reasons behind the nature of these interventions.

Health and hygiene initiatives, for example, promoted the principles behind the new design of latrines, the importance of hand washing after using latrines, and the health reasons for maintaining latrines in good condition.

GBEP has also disseminated health messages on the use of soap. It drew attention, for example, to international evidence that "appropriate handwashing (using soap) can cut diarrhoeal diseases by 43%".<sup>1</sup>

To support and encourage hand-washing, the project built tiled plinths outside of all latrines and supplied stainless-steel water containers, with taps, together with washing bowls, for mounting on these plinths, as shown in the adjacent photograph.



Hand-washing facilities, provided outside latrines

Promotion of environmental awareness has largely been in relation to the "greening" of campuses and conserving non-renewable and scarce resources through, for example, design solutions for school buildings that use less wood, and the efforts that have been made to foster the use of solar energy. These initiatives proved very successful. (See, for example, Section 8.8 below).

Areas of project experience in relation to health and hygiene have also yielded lessons that can support future innovations and guide policy makers, planners and managers in other contexts. Perhaps not surprisingly, the extent to which schools adopted the health and hygiene practices promoted by the project has been uneven. In many schools, some very good practice has developed and appears to be sustainable; in other schools, the response has been less encouraging.

The use of hand-washing facilities has proved an especially difficult practice to encourage. Where hand-washing facilities are not being used, despite being provided, the reasons appear to be threefold:

- The stainless steel water container and washing bowl were not put out on the plinth for fear of theft;
- Some schools, especially in very arid areas, genuinely still have insufficient water, despite the project's water supply interventions, to fill hand-washing containers on a regular basis.

<sup>1</sup> "Handwashing: Soap and Water Could Save a Million Lives a Year" *The Economist*, 6 July 2002, p.83

- School staff have not themselves accepted or internalised the health and hygiene principles behind the promotion of hand-washing. This clearly has implications for additional training and health/hygiene promotion.

Conversely, to highlight what can be achieved when school staff do become convinced of the importance of the hand-washing messages, one school that did not receive any hand-washing facilities from the project, but received training, invented, manufactured and self-funded, its own low-cost facilities:



A low-cost solution for providing hand-washing facilities developed by a non-civil works school in Hezheng County, under its own initiative and funds. The school is highly commended for its creativity and resourcefulness.

This particular solution also offers important lessons. It provides a low-cost alternative that may be more-suitable for contexts with less available resources. Used oil drums are relatively cheap and in wide supply. Significantly, with a low-cost solution, that is also larger and less-easy to carry off, the fear of theft (real or perceived) may also be reduced.

## 8.8 Solar Heaters

The GBEP introduced solar heaters to schools with great success. GBEP schools now use their solar heaters to boil water, to make it safe for drinking.

In Gansu, many children stay at schools the whole day and are reliant on the schools providing them with water made safe through boiling. The GBEP, by providing facilities for boiling water, addressed two important development agendas: promoting health, and enhancing basic conditions in a way that helps to make schools more child-friendly. Additionally, through the particular technological solution offered - a solar heater - two further development agendas have been addressed: cost-reduction and environmental protection. Heat generated from the solar heater is free and there is no environmental degradation through the burning of fossil fuels.

The basic principles of the solar heater can easily be understood from the two photographs below. A parabola covered with mirror tiles, concentrates heat from the sun to a focal point beneath a metal stand on which kettles and pans can be placed.

The solar heaters have proved universally popular and are used several times daily in all schools. They function well technically: that is to say, they can quickly boil water on all but the sunniest

days. The design has also proven to be very robust. Over its expected lifetime, a solar heater will undoubtedly prove to be a cost-saving and environmentally friendly intervention.

The introduction of solar heaters in remote rural environments has also created an important "signal effect". It has helped to promote the wider use of renewable energy, demonstrating what is possible. It has also helped to raise environmental consciousness: on the part of children and members of the schools' wider communities.



Two solar heaters in use: to boil water in a kettle.

## 8.9 Lighting

The GBEP installed electric lighting in some school classrooms. The greatest transformation this brought about is the potential created to use these classrooms in the evening, outside of normal school hours.

It is helpful to consider the significance of this. Typically in Gansu, and indeed in the majority of schools in many countries of the world, each day, outside of normal school hours, school facilities are often unused. When weekends and school holidays are taken into account, there are many days in the year when these facilities do not provide any form of educational return on investment. This is not an efficient use of costly resources.



Electric lighting creates the potential for wider educational and community use of buildings and equipment: to maximise returns on educational investment.

Some more-developed countries are increasingly coming to recognise this as an unsatisfactory situation and striving to find ways of putting facilities to increased use - educational, social, and commercial. There is an unfortunate irony that less-developed countries, less able to afford the costs of providing education to all citizens, tend not to have made as much progress in recognising the need to use their resources more efficiently.

In other words, a key challenge for policy makers, planners, and those in authority - in China and elsewhere - is to think increasingly of school buildings not simply as school buildings, but as educational and community resources in a far broader sense. But, this is not an easy challenge. It is well understood that there are many complex institutional factors that tend to constrain dual or multiple use of educational facilities.

Formal schooling and non-formal education are typically completely different sections within education ministries, with separate budgets and lines of accountability: in China, just as in most countries of the world. Who will pay for such things as heating, lighting, and maintenance when there is more than one category of building user? Who will be responsible for security? Who owns the buildings? And so on.

These are difficult issues to resolve. However, as pointed out above, best international practice confirms that the issues are not insurmountable: educational facilities can function as schools during the day, but then become adult learning and educational resource centres in the evening as well as function for other forms of informal community use. This leads not only to economic benefits, in the sense that a greater return is achieved on investment. There are social and educational benefits for the school also. Multiple uses of educational facilities helps to bring the school and community closer together.

In summary, the installation of lighting in schools involves capital and ongoing running costs that could be used for other needs and priorities. It should be justified properly, therefore. Perhaps the best way to achieve this is to make the provision of lighting conditional on the formulation of a clear aim or vision to maximise facilities use, and a firm commitment to exploit the extra hours made available for wider educational and community use, and even for income generation - through commercial exploitation of facilities. Approached in this way, the developmental impact of lighting provision can be immense.

## 8.10 Access Features

The GBEP endeavoured to make some schools more accessible to physically disabled pupils through the provision of access ramps and other features such as handrails in toilets. Such interventions were directly in support of the project's equity strategy and its objective to extend access to disadvantaged groups. There was no previous tradition of incorporating access features for the physically disabled in school designs in Gansu. It was hoped therefore, that the project's contribution would help to raise awareness of such equity issues where they may not previously have been considered.



An example of an access ramp provided by the project

In practice, this seems to have been what has occurred. While, for example, no evidence has so far emerged of access ramps being used (unavailability of wheelchairs has proved to be one important constraint), these features provide a physical reminder that it is appropriate to consider access issues wherever this is practical. Consciousness has been raised, and the access facilities provided may be a legacy for the future.

## 9 COSTS AND EFFECTIVENESS

The GBEP's initiatives in improving the learning environment have been extremely well regarded. Because of the magnitude of change that has been brought about, many people have tended to assume that the costs involved have been high and can only be afforded with external support, not regular government funding. As Tables 9.1 and 9.2 presented below demonstrate, this is not, in fact, the case. The costs of most of the new hardware initiatives have been only slightly higher than "normal" costs.

For instance, with regard to the cost of building classrooms, the unit price is about 14% higher than locally accepted norms. It should also be pointed out that if the cost of the more-thorough supervision system is added in this might be about 15%. However, and importantly, these higher costs are offset by the longevity of the buildings - expected to be between 40 and 50 years.

As noted in Chapter 2, the costs of the new hexagonal desks and chairs are also only a little higher at 70 Yuan per child as apposed to 61 Yuan for standard desks and chairs. It is again important to stress that the difference might be even smaller if the new desks and chairs were procured in greater quantities leading to economies of scale.

Adding up all the initiatives which affect the learning environment in the classroom, Table 9.2 shows that the total cost per classroom is just under 30,000 Yuan. Excluding construction costs, this represents an investment of about 3,400 Yuan per class or less than 100 Yuan per pupil over the lifetime of the project.

It is also possible to share some project insights gained into relationships between perceived cost and effectiveness of the various hardware components. In a project workshop in June 2005, four groups of project stakeholders were asked to rank project hardware components: firstly, in respect of what they judged to be their effectiveness; and secondly, in respect of what they judged to be their cost. The stakeholders involved were a representative sample of: county-level civil works supervisors; civil works planners; project management office leaders; and school principals.

Table 9.3 summarises the results of this exercise. What is confirmed is a high degree of stakeholder consensus that the provision of classrooms has had the greatest impact in enhancing the learning environment, closely followed by the provision of dormitories, toilets and furniture. These are the most expensive project items. There is thus a direct relationship between cost and effectiveness. It seems that "what you pay for is what you get".

However, some very interesting cost-effectiveness patterns emerged in relation to other hardware components. The Happy Campus initiative was judged by workshop participants to have had a very high impact, relative to cost. The provision of teaching materials was also judged by workshop participants to have offered a higher return on investment than some other components. Components in which returns on investment were judged less favourable include boundary walls and ancillary rooms. While there are, therefore, seemingly some important patterns and findings in relation to cost-effectiveness, it should be stressed that workshop participants were insistent that all project hardware components have been justified and necessary, and played an important role in contributing towards enhancing the learning environment.

**Table 9.1:**  
**Unit Cost Comparison of Building between GBEP and Other Projects**

Item:		Project Unit Cost	Other Projects Unit Cost	Comments/Notes:
Class-room	Standard roof	550 Yuan/m <sup>2</sup>	480 Yuan/m <sup>2</sup>	Average per area in the four counties
	Experiment roof	560 Yuan/m <sup>2</sup>	NC (not constructed)	Labour cost higher than ordinary classroom, provided by Kangle
	Solar energy	800 Yuan/m <sup>2</sup>	NC	Provided by Kangle
	With activity room	570 Yuan/m <sup>2</sup>	NC	With additional facilities
Ancillary room		550 Yuan/m <sup>2</sup>	480 Yuan/m <sup>2</sup>	Average per area in four counties
Toilet		580 Yuan/m <sup>2</sup>	550 Yuan/m <sup>2</sup>	Average per area in four counties
Display rails		Inc. in classroom cost	N/A	
Plinth		Inc. in classroom cost	N/A	
Fixed cupboard		Inc. in classroom cost	N/A	
blackboard		Inc. in classroom cost	Inc. in classroom cost	
Desk (w/o stool)	Standard (can accommodate 2 students / desk)	123 Yuan each	Similar cost	purchased at provincial level
	Semi-hexagonal (can accommodate 3 students / desk)	216 Yuan each	Similar cost	purchased at provincial level
Water supply	Water butts	5000 Yuan each	4000yuan each	Provided by Dongxiang and Jishishan
	Piping from mains	3 Yuan/meter(Φ32)	Similar cost	Average in four counties
Happy campus		2000 Yuan/ school	500-2000 Yuan/school	Provided by four counties
Bunk beds for girls		540 Yuan each (with 2 mattresses)	410 Yuan each (without mattress)	purchased at provincial level
Boundary wall		220 Yuan/meter	180 Yuan/meter	Average in four counties, GBEP has a taller and stronger wall
Solar heaters		167.5 Yuan each	Not bought	Average price in purchased years
Coal Stoves		106 Yuan/set, Estimated on coal consumption of 20 kg/day	Similar cost	Average price in purchases these years
Classroom heating cost whole winter		5 Yuan/day/ classroom	5yuan/day	Estimated average price in four counties,

**Approximate Conversion Rates (September 2005 values):**

Pounds Sterling £1 = 15 Yuan

US Dollars US\$1 = 8 Yuan

Euro €1 = 10 Yuan

**Table 9.2:  
 Costs of Building and Equipping GBEP Primary Schools and Classrooms**

Basis of costing	Proportional Allocations and Costs in Yuan:			
	Cost per square metre:	Average square metre per class:	Average cost per class:	Average cost per school (5 classes)
3800 classrooms:	550	48	26,400	132,000
1,367,173 books:	Books per class:	Average cost per book:	Average cost per class:	Average cost per school:
	360	3.12	1,121	5,604
Desks and chairs for 3800 classrooms:	Desks and chairs per class:	Average cost per desk and chair:	Average cost per class:	Average cost per school:
	25	70	1,750	8,750
Stoves:	Stoves per class:	Average cost per stove:	Average cost per class:	Average cost per school:
	1	106	106	530
Bookshelves:	Bookshelves per class:	Average cost per bookshelf:	Average cost per class:	Average cost per school:
	1	450	450	2,250
<b>Total cost per school of building and equipping <u>five</u> classrooms:</b>				<b>149,134</b>
<b>Total cost per school of building and equipping <u>one</u> classroom:</b>				<b>29,827</b>

**Approximate Conversion Rates (September 2005 values):**

Pounds Sterling £1 = 15 Yuan

US Dollars US\$1 = 8 Yuan

Euro €1 = 10 Yuan

**Table 9.3:**  
**Cost-Effectiveness Ranking of Key Hardware Components \***

\* According to the Assessment of selected groups of project stakeholders, in a review workshop conducted in Linxia, on 25.06.05.

Group 1 (County Level Civil Works Supervisors)		Group 2 (Civil Works Planners)	
Ranking By Effectiveness/Importance:	Ranking According to Cost:	Ranking By Effectiveness/Importance:	Ranking According to Cost:
Classrooms	Classrooms	Classrooms	Classrooms
Dormitories	Dormitories	Furniture	Dormitories
Toilets	Toilets	Toilets	Toilets
Furniture	Ancillary rooms	Dormitories	Ancillary rooms
Ancillary rooms	Boundary walls	Ancillary rooms	Boundary walls
Boundary walls	Sports facilities	Teaching materials	Furniture
Teaching materials	Furniture	Sports facilities	Sports facilities
Water supply	Girls bunk beds	Coal stoves	Water supply
Happy Campus	Water supply	Happy Campus	Girls bunk beds
Sports facilities	Teaching materials	Girls bunk beds	Teaching materials
Girls bunk beds	Happy Campus	Water supply	Happy Campus
Coal stoves	Water boiling	Boiling water	Boiling water
Boiling water	Coal stoves	Boundary walls	Display facilities
Display facilities	Display facilities	Display facilities	Coal stoves

Group 3 (PMO Leaders)		Group 4 (School Head Teachers)	
Ranking By Effectiveness/Importance:	Ranking According to Cost:	Ranking By Effectiveness/Importance:	Ranking According to Cost:
Classrooms	Classrooms	Classrooms	Classrooms
Dormitories	Dormitories	Furniture	Dormitories
Toilets	Toilets	Toilets	Boundary walls
Happy Campus	Ancillary rooms	Happy Campus	Toilets
Sports facilities	Boundary walls	Dormitories	Ancillary rooms
Boundary walls	Furniture	Boundary walls	Furniture
Furniture	Girls bunk beds	Sports facilities	Sports facilities
Girls bunk beds	Sports facilities	Teaching materials	Girls bunk beds
Coal stoves	Teaching materials	Ancillary rooms	Water supply
Teaching materials	Water supply	Water supply	Teaching materials
Water supply	Coal stoves	Coal stoves	Happy Campus
Boiling water	Boiling water	Boiling water	Boiling water
Display facilities	Happy campus	Display facilities	Coal stove
Ancillary rooms	Display facilities	Girls bunk beds	Display facilities

**Key:**

	Perceived Effectiveness proportional to Perceived Relative Cost =		Cost Effective
	Perceived Effectiveness Greater Than Perceived Relative Cost =		Very Cost Effective
	Perceived Relative Cost Greater Than Perceived Effectiveness =		Not So Cost Effective

	Examples of Significant <b>Unfavourable</b> disparities between perceived cost and effectiveness		Examples of Significant <b>Favourable</b> disparities between perceived cost and effectiveness
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# ANNEXES



## ANNEX 1

### SCHOOL LOCATION PLANNING: DETAILED TECHNICAL GUIDANCE

In this Annex the detailed technical guidance developed by GBEP, in support of school location planning is reproduced, in view of its potential wider interest. The step-by-step guide to implementation takes the following form:

#### Procedures

Prior to the commencement of construction it was essential to carry out a school location planning exercise. This exercise was carried out to ensure that the building of new schools and the expanding and rehabilitation of existing schools was being done in accordance with the objectives of the GBEP i.e. increasing access and equity for the poorest children in the project counties.

The school location planning exercise took the following form:

- A: Maps were drawn of each school district showing all existing villages and schools together with geographical features such as roads and rivers.
- B: County Planners compiled population data for each of the villages in the districts and prepared a ranking of the schools based on a poverty/remoteness index.
- C: The condition of existing school facilities in all villages in the districts was assessed.
- D: Weighted factors were used to give an advantage to dilapidated/dangerous buildings, minority populations, present school enrolment and out of school children.
- E: The outcome of the above exercise was a ranking of schools in order of priority according to objective criteria.

## Step-by-Step Guide

The following are the ten steps taken by GBEP. These steps can be modified as appropriate to suit other situations and circumstances. The tables referred to in this guide can be obtained from the GBEP PMO on request.

### Step 1

School District Directors hand draw a map (A3 size) of their districts locating and naming all villages, whether served by a school or not, and locating and naming all existing schools. Distances between villages and schools, and between villages and the county towns, should be shown in kilometres on the map. Key geographical features such as roads, rivers and mountains should also be shown.

Alternatively, if the school District Directors can be given access to county maps on a reasonable scale (1:50,000), blown-up copies of these maps for the area of the school districts could be used to locate the schools and those villages which are not already shown on these maps. The remainder of the information to be included is the same as that shown in the previous paragraph.

### Step 2

County planners complete Table 1 for population data. The county planners will use these tables to provide the initial ranking of the counties and schools with respect to access and poverty.

All the settlements having a population of 1,500 or more, and not served by an existing school within 2.5 kms distance or 30 minutes walking time from the settlement, should be listed in this Table. Population, school age population and number of children in school, desegregated by total and minority groups, should also be entered. Distance from the nearest school should be entered in the column for Access to School. The total number of communities in the village should be entered in the column for Number of Communities, where "the village" is defined as the administrative village, as reported in population and other statistics.

Three further columns should be completed in Table 1; the average per capita annual income, the type of geographic area (i.e. flat or mountainous) and the distance of the village from the nearest township centre.

County planners will also complete Table 2 showing school enrolment data for all schools, except the schools already receiving civil works under GBEP, CEP schools and schools already funded through a charity.

Copies of the relevant baseline data will be provided, and can be used to complete Table 1 and Table 2. Maps from school District Directors should also be used to complete the tables. Population data for each village in the county should be obtained from the county statistics bureau.

### Step 3

All villages and schools shown in Tables 1 and 2 should be classified as either "poor" or "remote", or "neither", according to the agreed definitions. Poverty is measured in terms of average per capita annual income for the village as "less than (an agreed amount of) Yuan". Remoteness is defined in terms of the distance from the nearest township centre in the mountainous areas. Villages and schools in flat areas are not to be considered remote, and are not classified as poor if the average annual per capita income for the village is equal to, or more than (an agreed amount of) Yuan. In this step, therefore, the county planners will first complete the column for "Poor and Remote" with a yes (Y) or no (leave the column blank). A village will be classified as poor and remote if it is both poor (average per capita annual income being less than the agreed level of Yuan) and remote (village being situated in a mountainous area).

The county planners can now perform an initial ranking of the villages and schools with respect to poverty and remoteness using Tables 1 and 2. However, the ranking will only be done for villages and schools classified as poor and remote.

Both poverty and remoteness will have equal weighting for the purpose of ranking. As average per capita annual income is the reverse indicator of poverty the appropriate formula for a compound measure of poverty and remoteness is:

Distance of the village or school from the nearest township centre + (100/average per capita annual income of the village)

The number resulting from the above calculation gives a compound measure of poverty and remoteness and thus can be used as a "Poverty and Remoteness Index". The larger the number resulting from the calculation, the higher the index and the poorer and more remote the village or school being considered. The results of the above calculation should be entered in the column for the "Poverty and Remoteness Index" provided in both tables.

The next activity is to rank order Tables 1 and 2 in descending order of the "Poverty and Remoteness Index". As a result, the most "Poor and Remote" villages and schools will appear at the top of the list in both tables. The ranking order position of each village and school should be entered in Tables 1 and 2 respectively in the column for "Rank Order".

The data from Steps 1 to 3 will be kept at county level and not sent to the prefecture, PMO or PedC, with the proposals for civil works. However, these data should be available with the county planner, and accessible to consultants when visiting counties. The data for Step 4 onwards will be submitted to the DFID (the GBEP project donor) with the civil works proposals.

### Step 4

Using the information from the maps and the two ranked tables, the county planners should draw up lists of villages and schools for each district as follows.

Use the ranked Table 1 of villages to identify in each school district the villages, or areas of population larger than 500, where provision of a teaching point, or a complete primary school, is

most needed. Enter the names of these villages in Table 3, together with the name of the school district and the calculated "Poverty and Remoteness Index". Rank the resulting list, within each category of schools (teaching points, complete primary schools in rural areas, and complete primary schools in urban areas), according to the "Poverty and Remoteness Index".

Use the ranked Table 2, to identify schools within each district most in need of expansion (i.e. needing additional classrooms, but no rehabilitation), and enter these schools in Table 4, together with the names of the school districts and the "Poverty and Remoteness Index". Rank this list according to the "Poverty and Remoteness Index".

Use the ranked Table 2 to identify the schools within each district which most need buildings rehabilitated (i.e. additional classrooms and rehabilitation of existing classrooms). Enter these schools in Table 5, together with the names of the school districts and the "Poverty and Remoteness Index". Rank this list according to the "Poverty and Remoteness Index" and select schools most needing rehabilitation of school buildings during Year 3 of the civil works programme. Identify schools in need of rehabilitation (i.e. additional classrooms and rehabilitation of existing classrooms).

### **Step 5**

Based on Step 4, and using Table 3, county planners should draw up a list of villages proposed for new teaching points, and/or new schools, recommended for inclusion in the next year's civil works plans. Schools should be categorised as one of the following:

- Proposed new teaching point.
- Proposed new complete primary school in a rural area.
- Proposed new complete primary school in an urban area.

When formulating the recommendations, priority should be given first to teaching points, second to complete primary schools in rural areas and finally to complete primary schools in urban areas. Schools should then be ranked within their categories according to the following weighted criteria:

- Expected student population - 60%
- Minority areas - 25%
- Distance from the nearest township centre - 15%

### **Step 6**

Based on Step 4, and using Table 4, county planners should select schools proposed for expansion of school buildings (additional classrooms) during the next round of civil works.

The following weighted criteria should be applied to rank the schools needing expansion:

- 40% for present school enrolment.
- 10% for minority students.
- 40% for out-of-school children.
- 10% for changing from a 3 year to a 4 year or from a 5 year to a 6 year school.

### **Step 7**

Based on Step 4, and using Table 5, county planners should draw up a list of schools proposed for rehabilitation of school buildings (additional classrooms and rehabilitation of existing classrooms) during the next round of civil works.

The following weighted criteria should be applied to rank the proposed schools for rehabilitation:

- 60% for dangerous buildings.
- 30% for number of out-of-school children.
- 10% for conversion from a 3 year to a 4 year school or from a 5 year to a 6 year school.

### **Step 8**

Details of the proposed facilities for each school and the estimated budget should be provided for the first 20 schools in rank order for each type of civil works for the above schools. Separate forms are provided for all the three types of civil works. The forms for each type of civil works are:

- "Data sheet for the proposed construction of a new school"
- "Data sheet for the proposed expansion of a school"
- "Data sheet for the proposed rehabilitation of a school"

### **Step 9**

The civil works and school mapping consultants will review the list of proposed schools. Site visits will be made and adjustments suggested as a result.

### **Step 10**

A report will be completed to show all the information gathered and to identify the final agreed list of schools.

## **BEYOND GBEP: FUTURE CHALLENGES**

Relevant Insights from Best International Practice

## ANNEX 2

### FURTHER REFLECTIONS: PARTICIPATORY TEACHING METHODS

Teacher training has a very important role to play if methods of teaching are to be transformed in Chinese schools. Teachers need to gain the necessary skills and understanding associated with modern teaching methods and be convinced of their value.

Interestingly, as discussed in the main text of this booklet, the GBEP experience has shown that changing the type of classroom furniture and the way it is arranged can also, **on its own**, influence the way children interact with each other and the way teachers behave in the classroom.

The GBEP experience has also confirmed that the greatest developmental impact tends to be achieved when interventions are linked. This was certainly the case when teacher training relating to participatory methods of teaching was linked the physical organisation of the classroom and the use of new furniture.

In this Annex, some ideas to promote modern methods of teaching are shared, linking pedagogical principles with an analysis of the characteristics of a number of non-traditional classroom layouts. These ideas reflect the GBEP experience, but they also take it a stage further drawing from best international practice. Before considering classroom layouts themselves, it is helpful to identify some basic group teaching principles.

#### *Some Group Teaching Principles*

Understanding why group activity might be used as a teaching technique helps to determine when group teaching might be appropriate and how it might be organised.

The following is a list of important reasons why a teacher may wish to organise group activity in his or her classroom:

- Allowing students to work in small groups is, educationally, very sound. It creates opportunities for cooperative learning and the development of cooperative learning skills.
- Group work can create the conditions for active learning.
- Group work can create conditions for students to learn from and support each other.
- Group work allows a teacher to cater for individual difference.
- By carefully organising the nature of groups, the teacher can set different students different types of tasks, according to their educational needs.
- Students can be set work that is more closely matched to their:
  - Ability

- Previous knowledge
- Pace of working
- Through group activities, students can also be set work that is more closely matched to their interests. Organising group work can give students a greater choice: they can elect for the kind of activity they would like to pursue.
- Group membership/organisation can be used as a behaviour management technique.
- The use of occasional group activity creates variety, and helps to maintain freshness and student interest.
- Groups can be organised on a heterogeneous basis; they can be organised on a homogenous basis; they can also be organised on a random basis.
- Resources such as apparatus (microscopes, computers, etc) and books, may be insufficient for the whole class, but will be sufficient for a small group. If different groups work on different activities, one of the groups will be able to use this equipment. If activities are rotated, eventually, all students will have a turn to benefit from the educational resources.
- Group activity can allow a teacher to give greater individual attention to students than would be possible through whole class teaching. This is achieved by setting groups different types of tasks. A fundamental group teaching principle is to set some groups on tasks that place a LOW DEMAND on the teacher. These groups should be able to work independently or with only minimal teacher supervision and support. Silent reading, creative writing, and an art activity are good examples of this kind of task. This frees the teacher to give close attention (HIGH TEACHER DEMAND) to one group of students. Rotating tasks of this kind will mean that all groups and students will benefit from closer teacher attention and support, for activities where this is beneficial.

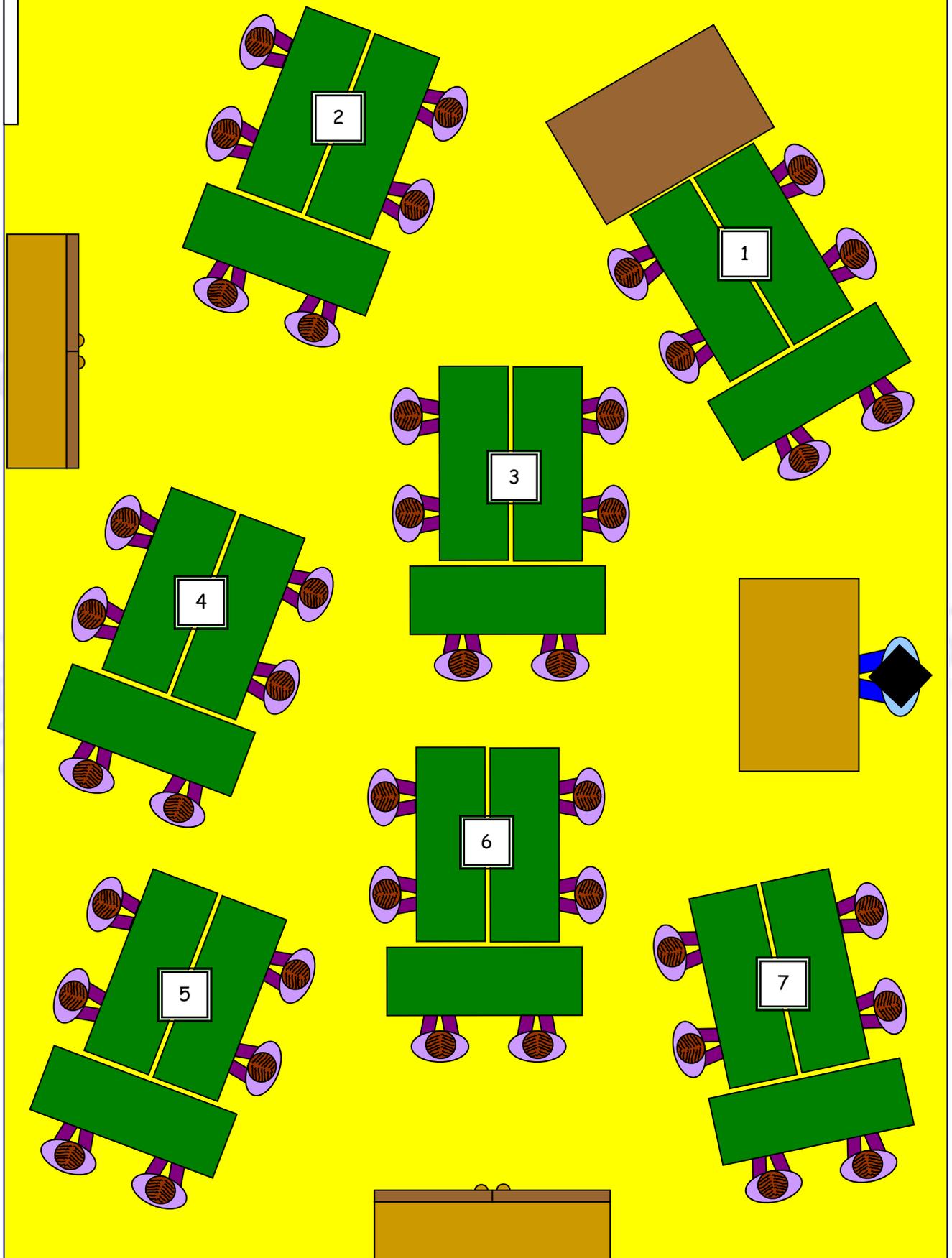
### *Examples of Non-Traditional Layouts and their Fitness for Purpose*

Three different classroom layouts are presented here, by way of example, to demonstrate what can be achieved by venturing beyond non-traditional classroom arrangements. Each layout is accompanied by a commentary highlighting the main features of the layout and the types of teaching situation to which it may be suited.

Layout 1 is a very interesting layout and there are lots of pedagogical points that can be made about it.

- The layout will work satisfactorily for traditional teaching. All students can see the front blackboard, though some students will need to turn their heads slightly when looking at the blackboard. If the teacher is talking/demonstrating at the blackboard for long periods, it would be a good idea for the teacher to ask some students to turn their chairs slightly, so that they are comfortable looking at the blackboard.
- This classroom is arranged with seven groups of six students. The seven groups are numbered 1 to 7 on the layout..

### Classroom Layout No. 1



- Depending on the teaching situation, all seven groups could be doing the same subject/activity. If wished, however, the teacher can arrange for different groups to be involved in different activities.
- For example, perhaps odd numbered groups are working on a mathematics assignment, while even numbered groups are writing a story. Writing a story is a "low teacher demand" activity. This will give the teacher more time to help a smaller number of students with their mathematics. Later on in the day or the week, the activities could be reversed, with the even numbered groups writing a story, while the odd numbered groups do mathematics.
- If wished, there could be as many as seven different activities going on at once! This would, however, be very ambitious and could be difficult to manage.
- Notice how one group - Group Number 1 - has an extra table. Perhaps, on some occasions, this could be set up for practical activity, such as a science experiment. Perhaps, there is not enough science equipment for every group to conduct an experiment at once. So, the class could be organised in way where Groups 2 to 7 study, say, geography, while Group 1 does its Science experiment. Over a period of seven lessons, every group could be given the chance to have "hands on" practical experience of conducting a science experiment. In this particular case it would probably make sense for the students to change places, when they do the Science activity.
- Notice how the extra table belonging to Group 1 is conveniently placed for the teacher, when the teacher is working at the blackboard.
- Notice how the tables are not arranged in rigid rows and columns. The intention in this arrangement is to create a less-formal layout that seems friendlier.
- The position of the teacher is very interesting indeed! Traditionally, the teacher sits at the front of the class in a position of authority. In this arrangement, the teacher is made to appear less like an authority figure. The teacher sits among the students - more like a friend, perhaps.
- If some students need more help than others, the teacher should think about where they are placed. It may be better if they sit close to the teacher: for example, on Tables 1, 3, 6 or 7.
- In this particular classroom arrangement there are two cupboards. It looks like the cupboards have been placed to be convenient for student use. It can be a very positive development to encourage students to take more responsibility for the management and use of learning resources in the classroom. This helps them to grow into independent learners.
- With any classroom arrangement, it is important to consider patterns of movement. For example: Can all students easily get to their desks when entering the classroom? Can the teacher easily get to the place of each student to offer individual assistance? Can all students easily get to the front of the blackboard, if they are asked to work on the blackboard? The furniture arrangement Layout 1 is rather cramped, as it is quite a large class. However, the layout seems to work reasonably satisfactorily in all these respects.

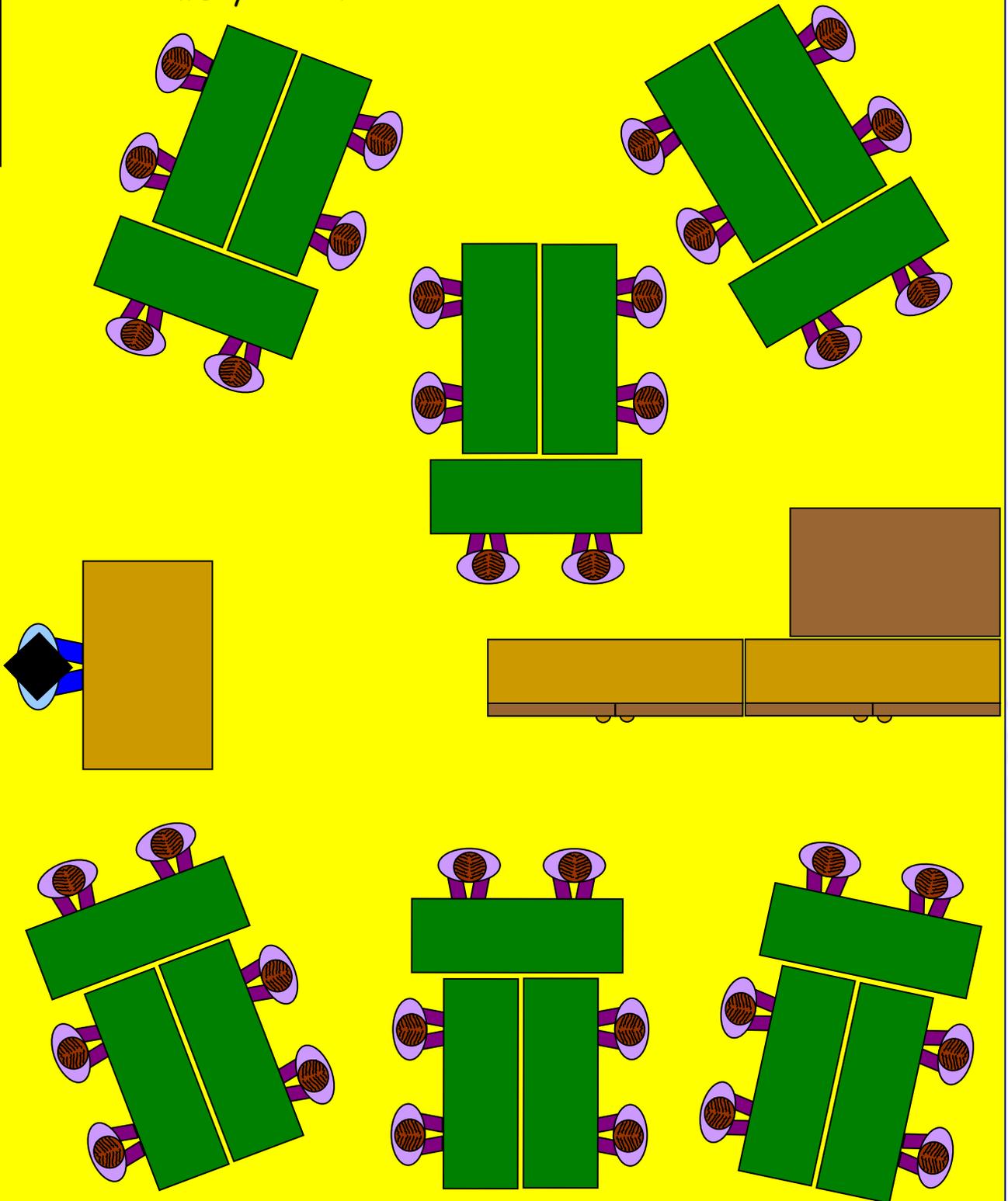


A real classroom illustrating some of the principles discussed. Different activities are being set up on different tables. For example, it looks like on group will be working on geography activity, with real "hands on" experience using a globe. At the same time, another group will answer questions based on their study of an anatomical model, perhaps using a worksheet. Notice how the teacher's desk has been moved to a non-traditional position.



Think about student movement in the classroom and the use of space. In the left-hand example students seem too close together. In the right hand example, desks seem far too close to the walls - unless the intention is to use the central area for an activity such as role play.

### Classroom Layout No. 2



Layout Number Two has been set up, among other things, to facilitate a multi-level or multi-grade teaching situation.

- The class is divided into two halves.
- In this example, the cupboards and table have been used to reinforce the division between the two halves of the class. Sometimes a teacher might prefer to emphasise the divide between the two halves. In other circumstances, it might be more appropriate to de-emphasise the divisions the teacher has chosen to make in the class.
- In Layout Two there are two blackboards. The GBEP provided a rear blackboard in all classrooms constructed or refurbished by the project. GBEP schools have used their rear blackboards well. However, in GBEP, rear blackboards have been used mainly for decorative purposes, including for use by students themselves. Layout Number Two highlights the potential, in appropriate circumstances for using a second blackboard in support of group, multi-grade, or multi-level teaching.
- Note that, again, the teacher's desk has been placed in a "non-traditional" position. The teacher is well positioned to supervise and support the work of the two sides of the class.

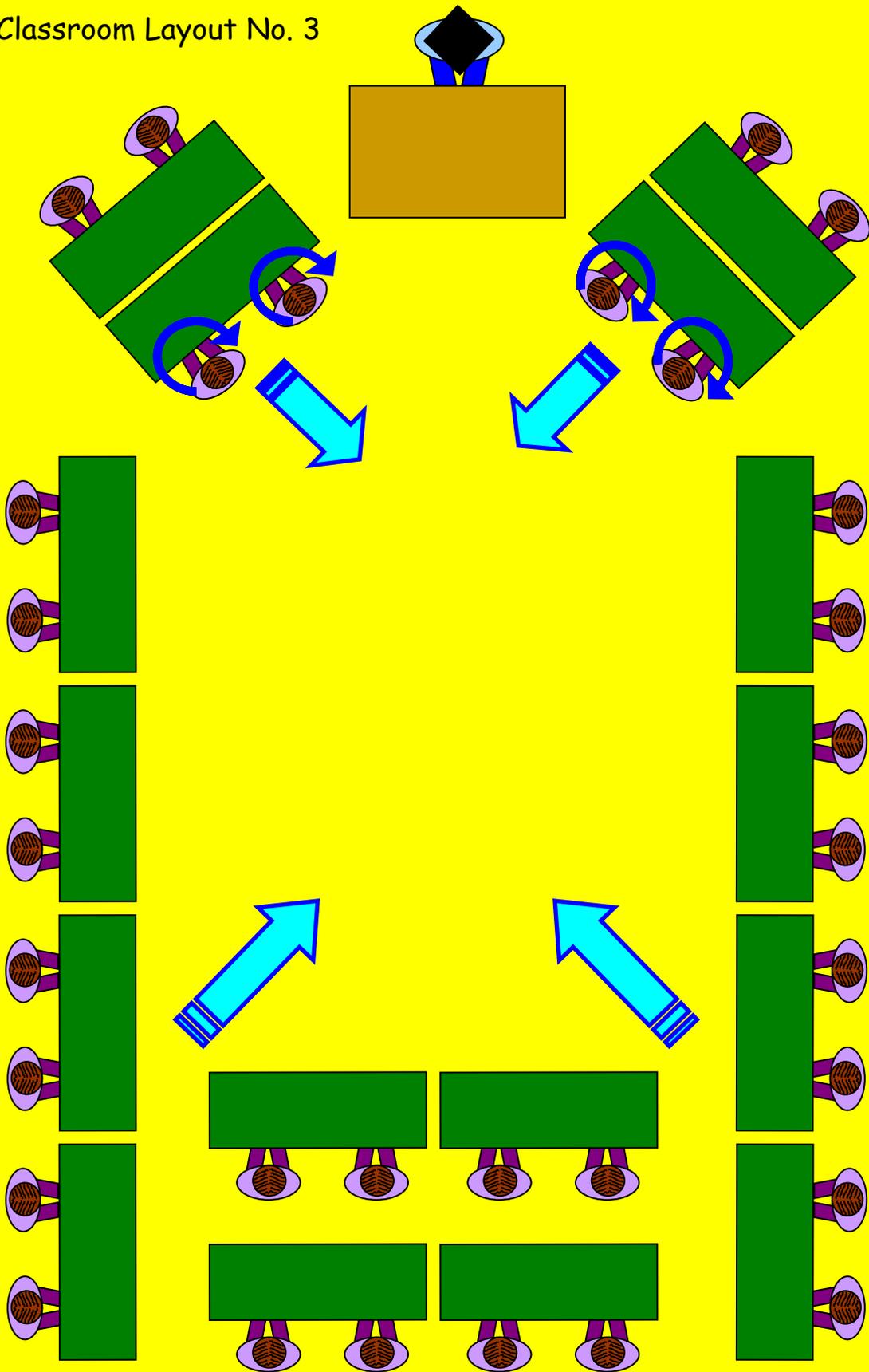
Classroom Layout Number Three is a rather special-purpose layout. It is particularly well suited to teaching that involves a lot of any of the following three activities:

- Discussion
- Role Play
- Practical Demonstrations (especially if the teacher places a demonstration table in the central area).

There are three key features of the design:

- There is a large central area, which all students can face. It can function like a stage in a theatre. It is an ideal space for role play and demonstrations. All students will have a good view of the activity. No student is a long distance away from the activity. (Compare this arrangement with a classroom arranged in a traditional way. If the teacher was conducting a practical demonstration at the front of the class, it would be very difficult for students at the back of the class to see, or feel involved. In Layout Number Three, most students get a "front row" view of any activity. Only a few students have to settle for a "second row" view. No student is seated in a "third row", or worse.
- From anywhere in the room, any student can make eye contact with MOST other students without having to turn round. This is good for discussions. Students can talk to each other naturally, including seeing each other's facial expressions. It should be noted that Layout Three is not perfect in this respect. It has been necessary to make compromises because of the number of students and the size and shape of the room. Some students will need to swivel in their chairs for demonstrations and discussions, and a few students still have their backs to some other students.

Classroom Layout No. 3



Layout Number Three will still function reasonably well for some formal teaching. All students can still see the blackboard by making a small adjustment to their natural seating position.

- The layout is interesting and stimulating in the "atmosphere" it creates. It would work well for pair work, but is not well suited to group work or practical work.



Real classroom situations illustrating some of the features discussed for "Layout Three". In the left-hand photograph, a teacher is conducting a demonstration, with good visibility for all students. In the right-hand photograph, the central area is being used for role play.

In concluding this discussion of classroom arrangements, in support of participative and other modern methods of teaching, it is important to stress that no single layout is perfect for all types of teaching. However, some layouts are far more versatile than others and some layouts are particularly well suited to certain types of teaching situation. Perhaps the most important point to be stressed is that classroom layouts can be changed regularly, as and when the need arises! If necessary and appropriate, they can be changed from lesson to lesson and even within lessons!

Teachers should be encouraged to experiment with different classroom layouts and to have the confidence to make changes. Some teachers may worry that making changes to classroom arrangements will be disruptive for students. This should not be the case. Students should enjoy the stimulation of a different arrangement as much as the teacher. If students themselves are trained to arrange the classroom in a particular way, according to a particular activity - whether it be role play or practical work - transformations in classroom layouts can be achieved in seconds and with no effort for the teacher.

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## ANNEX 3

### FURTHER REFLECTIONS: EDUCATIONAL DISPLAY

One of the greatest transformations in the learning environment, resulting from GBEP, has been in the quality and nature of display: in classrooms themselves, and elsewhere within the school environment. To understand why this is such a significant change, in this Annex, the opportunity is taken to identify some of the educational reasons why classroom display can be so important, and how and where effective display can be achieved.

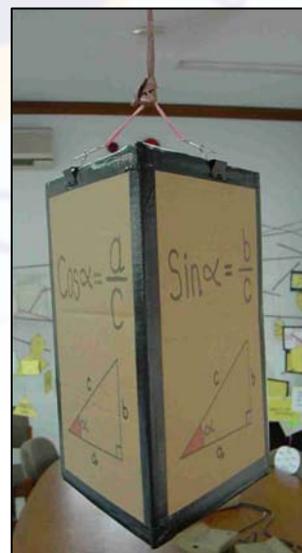
#### Some Educational Principles Relating to the Use of Display

It is helpful to consider: reasons for display; the display of students' work; display surfaces and display methods; and where displays can be made. Each of these four topics is considered in turn.

#### Reasons for Display

The following are some important reasons for display:

- Displays can be merely decorative. They can make the classroom brighter, and a more interesting and stimulating place. This, in itself, can have a direct impact on student motivation and thus on student learning.
- Display materials can include useful **direct** teaching aids (see the photograph on the right), such as anatomical models, number lines, and letters of the alphabet. They can help to make the teacher more effective.
- Display materials can include **supplementary** teaching aids that simply **enrich** or **reinforce** what is being taught, helping to bring the subject "to life". If a foreign country was being studied as part of "geography", a display might include pictures of the people and their costumes, famous landmarks, and so on.
- Displays can take the form of useful reference material, to support student learning: such as mathematical formulae.
- Display material can include information that it is important for students to memorise: such as number tables, formulae (see the photograph on the right), spellings and other important factual



information. The display material can be used for "drills". Students will also tend to learn the material, simply because it is displayed and there to look at.

- Displays can be used to "set the scene" for a new teaching topic. The teacher can put some stimulating material on display to promote student interest in a topic that is going to be taught. If the theme was "volcanoes", some interesting pictures and diagrams about volcanoes might be displayed before the teaching begins: perhaps even several days before, not just immediately before the lesson.
- Displays can form the central basis of a piece of class work or a topic. They can be a means of reporting on, and recording, the work that has been undertaken. For example, the title of a display might be "What we did in Science".
- Displays can be *part* of some ongoing work. For example, if metamorphosis is being studied, a display might include an aquarium with tadpoles. The growth of tadpoles can be monitored and recorded on graphs that form part of the display.
- Displays can be used to stimulate and create student interest. Books might be displayed on a shelf, and opened at an interesting page (see the photograph on the right), to encourage students to read. A "nature table" is another example of a display to create interest.
- Displays can be used to provide students with something extra to do, in spare moments. A "puzzle of the day" would serve this purpose well. Few students will be able to resist trying to solve it!
- Displays can be used to promote class management. They can include lists of routines, responsibilities, tasks, and rules. They can include directions, labels, and instructions.
- Displays can form part of record keeping. They can be used to record student and class progress, and topics covered. They might also record student awards, such as "gold stars" and bonus points.
- Displays can be used to communicate to others what the class is doing. This can include other students from a different class, other teachers, the principal, official school visitors, parents, and members of the local community.



These display shelves were improvised from scrap box lids of cardboard boxes that had previously contained photocopying paper.

### *The Display of Students' Work:*

- The display of students' work is an aspect of display that is so important that it deserves special consideration. It is a powerful way of showing students that their work is valued. It creates a sense of achievement. It can vastly enhance student motivation.
- The display of students' work needs to be approached sensitively. It is important that some students do not feel excluded or failures because their work is not displayed. It should be a target to ensure that all students have a piece of their work on display somewhere. This can

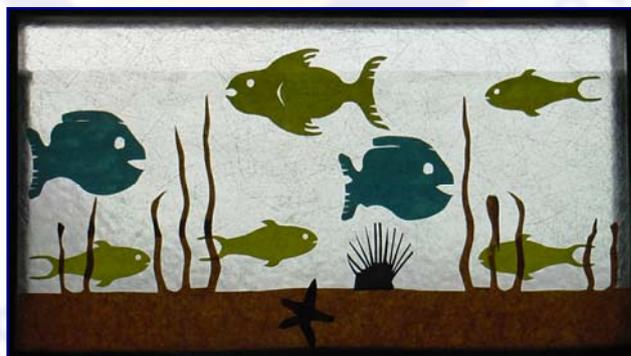
be achieved by having an "all class" display that includes one piece of work from each student, or a space for each student to display his or her best piece of work.

- Displays should celebrate effort, as well as perfect work.
- Displaying students' work can help students to appreciate their own work and the work of others.
- In most cases, students' work should be displayed with names visible - so that they students receive recognition.
- Students' displayed work should always have a name on somewhere, (even if at the back) so that the teacher knows to whom it belongs: when it is marked, when it is returned, or stored for record purposes.
- Older students can be involved in putting up displays themselves. But they will need to be taught how to do this well, and some supervision will be necessary. This can be labour saving for the teacher. It can also increase students' sense of ownership and pride in the display. Students will also be able to contribute their own ideas to making a creative and stimulating display.

### Display Surfaces and Display Methods

Classrooms may have a notice board or display rails that can be used for classroom display. These are valuable facilities, but teachers should not make the mistake of thinking that they are essential or the only places for classroom display. All of the following are potential display surfaces:

- Walls - especially if special adhesive is used which does not damage painted surfaces.
- Windows (see the photograph on the right).
- The Ceiling - from which displays can be suspended e.g. as mobiles.
- The Floor.
- Windowsills.
- Shelves.
- Cupboard tops.
- Backs/sides of cupboards.
- Backs of bookcases.
- Tables.
- Boxes.
- Chests.
- String "washing" lines.
- Display stands (which can be improvised from many things).



A window display, using translucent coloured paper.

### Where Displays can be Made

While most educational displays may take the form of classroom displays, it is worth thinking about where else displays can be made - especially of students' work as a way of giving praise and credit and promoting motivation.

Other good places, especially for larger schools, can include:

- Corridors, verandas, and staircases (as in the photograph on the right).
- The reception area.
- The school library.
- The school dining area.
- The staff room. (Even though students do not themselves usually use the staff room, it will be a source of great pride to them if they know their own work is thought worthy enough to be displayed there).
- The headteacher's/principal's room.
- Another school: perhaps even an exchange of students' work from a school in another country!
- Some other public place (this can be extremely motivating) such as a local library, community hall, or hotel, or other government building, such as a hospital.
- It might even be possible to get some students' work published. For example a story or poem in a local/national newspaper, or the newsletter of some local society.



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## ANNEX 4

### FURTHER REFLECTIONS: HAPPY CAMPUS

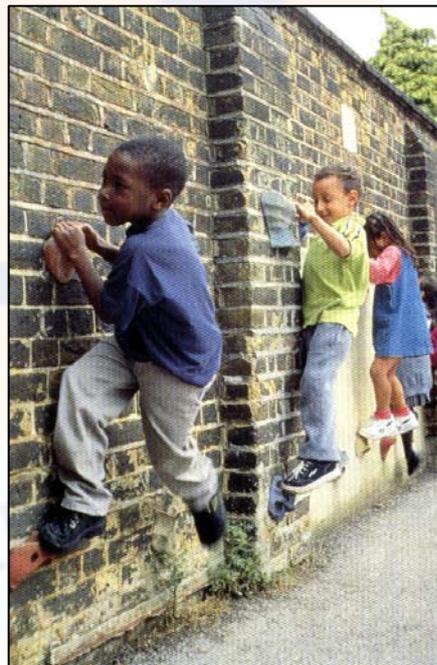
The creation of a Happy Campus environment in so many schools has clearly been one of GBEP's greatest achievements. In this Annex, the opportunity is taken to provide some further reflections on how this excellent achievement might be taken a stage further, drawing from best international practice.

GBEP has encouraged purposeful playground activity. Additional impetus to children's enjoyment of playground games could be given by introducing some new games that are not known locally, but played excitedly by children elsewhere in the world. The following are some important Internet resources that can help to stimulate new ideas. (These resources include handbooks that can be downloaded in full):

- *Active Playgrounds: A Guide for Primary Schools*, British Heart Foundation, 2001  
[http://www.bhf.org.uk/youngpeople/uploaded/bhf\\_active\\_playgrounds.pdf](http://www.bhf.org.uk/youngpeople/uploaded/bhf_active_playgrounds.pdf)
- *Playground Markings and Other Traditional Games*, South Eastern Health Board  
[http://www.sehb.ie/publications/playground\\_markings\\_trad\\_games/playground\\_markings\\_trad\\_games.pdf](http://www.sehb.ie/publications/playground_markings_trad_games/playground_markings_trad_games.pdf)
- *The Health Promoting Playground: Ideas for Marking Your School Playground*, Welsh Assembly, Third Edition 2002  
[http://www.healthschool.org.uk/pdf/healthpromoting\\_playground.pdf](http://www.healthschool.org.uk/pdf/healthpromoting_playground.pdf)
- Playground games ideas:  
<http://homepage.tinet.ie/~seaghan/play/games.htm>

Another challenge to consider is: how to go beyond mere decoration when painting boundary walls? Perhaps adornments could include sports features such as painted goal posts or targets to practise ball-throwing accuracy. What educational games or puzzles could be incorporated, and what kinds of illustration could play the role of useful teaching aids? It might be worth convening a project workshop to "brainstorm" on these possibilities.

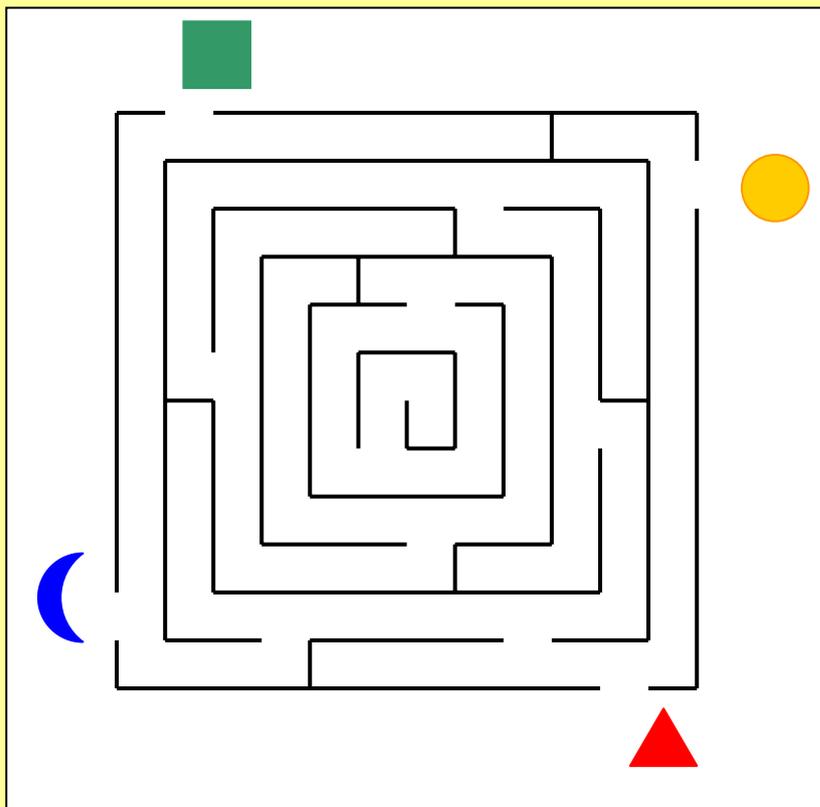
An idea being used with much popularity and success in a number of UK schools is the "Traversing Wall". The photograph on the right shows children playing on a traversing wall in a multicultural school in England. Children can safely enjoy the experience of "climbing", by travelling along the wall horizontally, with no danger of falling from a great height. The effect could be even more vivid and attractive for children, if a mural of a mountain, and other obstacles such as a bridge, was painted on the wall to stimulate their imaginations.



A "traversing" boundary wall - see text for explanation

(Picture from *Learning through Landscapes*:  
[www.lt1.org.uk](http://www.lt1.org.uk))

## A MAZE GAME



### How to Put Down this Marking:

Make a variety of lines, the size of which should be determined by the space available. The lines should be at least 30cm apart. (45cm spacing works well). If there is no available hard surface for marking out a maze with paint, the maze could be marked out on a softer surface using small pebbles or stones

Four different coloured shapes indicate each entry point to the maze.

### How to Play the Game:

Place a number of items randomly in the maze. The players each select an entrance to the maze, which becomes their "home base". The aim is for the players to collect as many items as possible from the maze and return them to their home base. The player with the most items wins.

Ensure that players change starting positions at the beginning of each game. The game may be adapted by adding more items and also by making teams where players must take turns in retrieving the items on the maze.

### Rules:

Only one item at a time may be collected from the maze.

Players cannot step over or reach across lines to collect the items.

An example of a playground game, which is new to schools in Gansu. The Internet is a rich source of ideas for introducing new games that may not be known locally.

Source: This particular game is taken from: *Playground Markings and Other Traditional Games*, South Eastern Health Board, p. 8.  
[http://www.sehb.ie/publications/playground\\_markings\\_trad\\_games/playground\\_markings\\_trad\\_games.pdf](http://www.sehb.ie/publications/playground_markings_trad_games/playground_markings_trad_games.pdf)



The top right photograph shows a map of the world printed on tiles. This is an excellent example - in a Jishishan school - of outdoor display that has gone beyond the decorative and fulfils an educational role.



The playground markings in the three photographs above and left are from schools in England. The markings can be used as the basis of games. They also have educational potential. They can be used to reinforce maths skills such as counting forwards and backwards in ones, twos and threes, for example. Pupils can jump on the squares as they count.

Unfortunately, playground surfaces in many Gansu schools are soft: so do not lend themselves to this kind of marking. It might be possible, however, to lay a hard surface in a small area to accommodate such activities.

*(UK Pictures from Learning through Landscapes: [www.ltl.org.uk](http://www.ltl.org.uk))*

As a result of GBEP and the Happy Campus initiative, the wider school grounds are now regarded as a much more valuable resource. The best school grounds are now much more child-friendly. They are bright and attractive, and they provide lots of opportunities for children to play, especially as a result of the provision of sports equipment.

To build on this achievement, perhaps the greatest challenge of all is to now think how more use can be made of school grounds as a learning environment: to make learning more practical, stimulating, and meaningful. Curriculum areas with lots of potential in this regard include mathematics, science, geography, and environmental studies.

There may be value in convening a workshop to examine areas of the curriculum and to identify how these can be taught outside of the classroom, using the school grounds, in a practical way. For instance, one future school grounds feature that has enormous potential for promoting classroom learning is a weather station. Purpose-made equipment for school weather stations can be purchased commercially. However, a lot can also be achieved, and a great deal of interest stimulated using low-cost, home-made, apparatus from scrap materials. A large budget is not necessarily required, therefore. The text box on the next page illustrates some of the possibilities in this regard, and identifies useful sources of further information.

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CHINA /

1999-2005

GANSU BASIC EDUCATION PROJECT

A wind vein can be made from scrap wood:



More information and instructions are provided at:  
[http://www.bbc.co.uk/tyne/weather/wind\\_vane.shtml](http://www.bbc.co.uk/tyne/weather/wind_vane.shtml)

A rain gauge can be made from litter:



More information and instructions are provided at:  
[http://www.bbc.co.uk/tyne/weather/rain\\_gauge.shtml](http://www.bbc.co.uk/tyne/weather/rain_gauge.shtml)

A barometer can be made from the following:

**What you'll need:**

- One clear glass or plastic jar
- One piece of transparent tube, a drinking straw is ideal
- Sticky tape
- A little bit of modelling clay
- Some cold water
- a few drops of food colouring.

More information and instructions are provided at:  
<http://www.bbc.co.uk/weat/weather/barometer.shtml>

**A WEATHER STATION:**

Promoting the use of the School Grounds as an educational resource

A School Weather Station is an excellent example of how whole school grounds can be used to promote learning.

Equipment for a weather station can be purchased commercially. Where no funds are available, equipment can also be home made, from scrap materials - as these examples show!

*Acknowledgement: source of illustrations and text used left: www.bbc.co.uk*

Another very useful handbook is *Simple Weather Measurements at School or at Home*.

This handbook provides lots of ideas, including how additional weather instruments can be made from low-cost and scrap materials.

A copy of the book has been shared with the project. It can also be downloaded, for free, from the Internet at:

<http://www.rmets.org/pdf/SIMWweameasurements.pdf>

## ANNEX 5

### FURTHER REFLECTIONS: SCHOOL MAINTENANCE

A number of high quality resources, drawing on best international practice and offering further ideas and technical guidance on school maintenance are available on the Internet. The following is a selection of manuals that can be downloaded, for free, in full:

- BASTIDAS, Pedro (1998) *Maintenance Manual for School Buildings in the Caribbean*, Organization of American States, General Secretariat, Unit for Sustainable Development and Environment, OAS-Echo Project to Reduce the Vulnerability of School Buildings to Natural Hazards, USAID-OAS Caribbean Disaster Mitigation Project.  
<http://www.oas.org/cdmp/document/schools/maintman.htm>
- MINISTRY OF EDUCATION, REPUBLIC OF RWANDA (2000) *Manual - Maintenance Programming - All Schools* (Kigali, Division for Construction and Equipment of Schools).  
<http://www.mineduc.gov.rw/eRW%20Manuals%20pdf/eRW%20Maintenance.pdf>
- US DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, NATIONAL FORUM ON EDUCATION STATISTICS (2003) *Planning Guide for Maintaining School Facilities*, NCES 2003-347, prepared by T. Szuba, R. Young, and the School Facilities Maintenance Task Force, Washington D.C. *[This is a very detailed manual on school maintenance developed for the USA context. However, many of the principles covered have wider international relevance.]*  
<http://nces.ed.gov/pubs2003/maintenance/index.asp>

Textboxes on the next two pages provide examples of the kinds of guidance these resources provide.

## Examples of Basic Principles and Practical Guidelines In Support of Effective School Maintenance:

Taken and adapted from: BASTIDAS, Pedro (1998) *Maintenance Manual for School Buildings in the Caribbean*, Organization of American States, General Secretariat, Unit for Sustainable Development and Environment, OAS-Echo Project to Reduce the Vulnerability of School Buildings to Natural Hazards, USAID-OAS Caribbean Disaster Mitigation Project. <http://www.oas.org/cdmp/document/schools/maintman.htm>

- A school maintenance programme is an organizational activity carried out by the school community in order to prolong the life expectancy of school buildings, its furniture and equipment.
- It should have a sufficient staff and budget for proper maintenance.
- The school personnel should include school maintenance fund-raising activities as part of the school maintenance programme.
- The maintenance programme should be comprised of three basic components: organization, inspection, and maintenance plan.
- The organizational structure of the school maintenance programme should clearly define duties and responsibilities, and should vary with the complexity of the school community. Avoiding large and complex structures is highly recommended. Principals, representatives from parent teacher associations, students, and any other school organizations should be responsible for establishing the school maintenance programme. The success of a school maintenance programme depends on the school community's ability to be organized and keep track of all activities included in the programme.
- A school maintenance programme's basic organizational structure should include a general coordinator, a fund-raising coordinator, and a responsible team for every area of the school building.
- A preliminary school building inspection needs to be conducted in order to prepare a school maintenance plan. The information gathered during the preliminary school building inspection is the basis for the maintenance programme. The better the inspection, the better the programme.
- The inspection can start with simple observations of the inside and outside of the school, simply walking around the interior and the exterior, looking at it carefully. Prepare and use checklists to determine which items require attention and then match the recommendations in the corresponding section to determine what action should be taken. Checklists can be divided into sections based on the main components of the school building.
- Areas of the school building can include:
  - Structure
  - Roofing
  - Building exterior
  - Building interior
  - Plumbing
  - Electrical
  - Grounds
  - Furniture and equipment.

## Examples of Maintenance Action Plans:

Taken and adapted from: MINISTRY OF EDUCATION, REPUBLIC OF RWANDA (2000) *Manual - Maintenance Programming - All Schools* (Kigali, Division for Construction and Equipment of Schools). <http://www.mineduc.gov.rw/eRW%20Manuals%20pdf/eRW%20Maintenance.pdf>

### Carry out maintenance of schools according to four programmes:

1. Activities to be carried out **daily**.
2. **Weekly** inspection of buildings and the school grounds.
3. Minor repairs to be carried out **at the beginning of each term**, or as appropriate if urgent.
4. Maintenance programme **at the beginning of each year**.

### Examples of Defects to Look Out for:

- Leaking taps, pipes, overhead tanks
- Blocked/damaged gutters, downpipes, and drains
- Broken window panes, hinges, locks, etc
- Leaking roofs, loose/missing tiles
- Structural damage in roofs and ceilings (e.g. loose/missing tiles)
- Cracks and damage in walls and pillars
- Faulty electrical items and exposed wiring
- Growth of plants on roofs, walls, and gutters, etc
- Unstable embankments and retaining walls.

### An Example of a Daily Maintenance Action Plan - Classrooms

- Supervised by the class teacher
- Appoint two students for each day on rotation

#### *Morning:*

1. Sweep the classroom, dust and clean furniture, blackboards, glass windows, etc.
2. Dispose of litter
3. Water plants, if needed
4. Clean areas surrounding the classroom

#### *Afternoon:*

1. If installed, switch off lights and fans, etc.
2. Close doors, windows, gates, etc.

### An Example of a Daily Maintenance Action Plan - Common Areas

(Include, as appropriate, such areas as: toilets, offices, library, laboratories and other specialist rooms)

- Supervised by a teacher appointed for each area
- Assign a class for each area for a month
- Appoint two students from that class on rotation

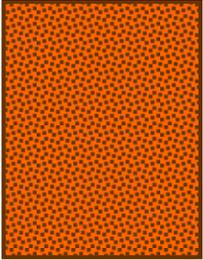
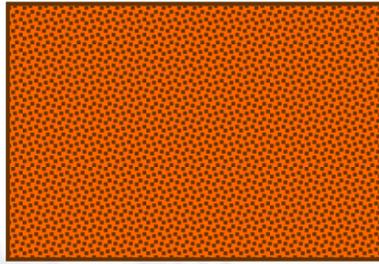
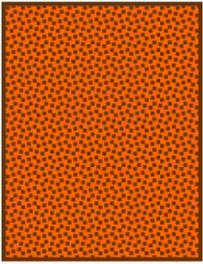
*Morning and Afternoon:* similar routines as for "classrooms" above

### An Example of a Daily Maintenance Action Plan - School Grounds

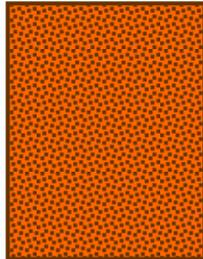
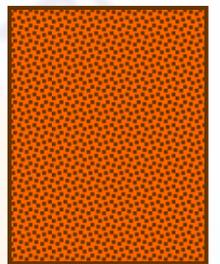
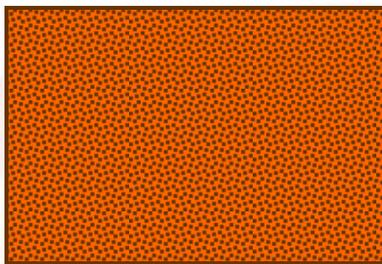
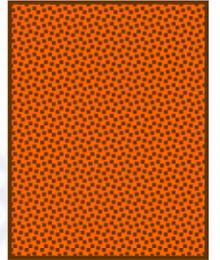
- Supervised by an appointed teacher
- Employ a class for each working day, as planned in advance

#### *As the timetable permits:*

1. Sweep and clean school grounds and clear drains.
2. Dispose of garbage



**About this book:**  
 The primary purpose of this book is to try to influence thinking about the design and equipping of rural schools in China, based on the Gansu Basic Education Project Experience. However, many of the achievements and innovations of the project, in respect of enhancing the learning environment, have international relevance. The publication also has a role to play, therefore, in the wider international dissemination of project experience and the lessons learned.



**About the Authors:**  
 Dr David Smawfield is an international education consultant with special interests in the enhancement of the learning environment. Professor Yongfeng Du is Director of Earthquake Protection and Disaster Mitigation at the Lanzhou University of Technology. The photograph on the right shows Dr Smawfield (centre) and Professor Du (right) in discussions with a teacher, during the field work on which this publication is based.

