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# CURRENT DEVELOPMENTS IN SCHOOL PLANNING IN EUROPE AND THE U.S.A.

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This article discusses observations made during a study tour of Europe and the United States. The purpose of the trip was to investigate developments in connection with the design of school buildings and to study the implications of planning associated with the emerging developments in educational concepts and methods.

The physical facilities of a school represent an integral and inseparable part of the education process and there is no logical way to separate them. Any discussion, therefore, of the developments in school buildings must begin with a close look at the trends in educational concepts. If we do not know and understand the methods of teaching used now or envisaged for the future we cannot design schools that will meet satisfactorily the needs of a specific educational programme.

Probably the most important educational trend receiving wide attention today, particularly in America, is the attempt to make the pupil the focal point of the school and to treat each student as a unique and important person. This has resulted in the abandonment of many traditional practices of class and school organization and created an impetus towards team teaching and instruction in groups of various sizes. Following these concepts there is a growing trend towards the use of such technological developments as closed circuit television, language laboratories and other audio-visual aids.

### **PRIMARY SCHOOLS**

In America it is felt that the maximum size of a group in a primary school in which an individual pupil can readily be identified is 200. Obviously school enrolments cannot be limited to this number and therefore a planning concept must be developed to provide 'schools within a school'. The design of these 'schools within a school' is being influenced greatly by the system of instruction known as team teaching.

This is built around the concept that instead of having a ratio of one teacher to approximately 30 pupils, a multiple ratio of teachers to pupils is used, such as two teachers to 60 pupils or three to 90. It permits the use of the strength of each teacher rather than requiring each teacher to instruct in all phases of the syllabus. This means that instead of a teacher being limited to one group of, say, 30 pupils, she may from time to time work with as few as 7 or 8 pupils or as many as 60 or 70. In this manner it is possible to take advantage of her talents and minimize any weaknesses she may have. This trend developed out of the desire to make better use of teachers' talents, to give teachers more time for preparation, to provide for some form of training by teaming a new or inexperienced teacher with those more experienced, and to give the pupils individual attention. Teachers, while remaining basically responsible for one group, share their professional knowledge and talents with the other members of their team and the individual pupil thus benefits from the shared concern of a small team of teachers.

The primary school principal, however, still remains the leader of the school and the number

of teams that may operate in a school building varies from school to school. Each team has a team leader and in America they have found that this system provides teachers with greater professional satisfaction.

Team teaching enables the strict chronological age-grouping of children to be re-assessed and the children can be regrouped. This means that they are no longer established in their group of 25 to 30 at the beginning of the school year and maintained in that group till the end of the school year. Depending on the subject taught, the techniques used, and the learning ability of the pupil, children are regrouped from time to time.

The plan concept to permit a team teaching programme is one of a number of house units, each providing the total educational world for a group of between 180 and 200 pupils. These units are 'to all intents and purposes' individual schools and yet they are at the same time components of a mother school. Each is built around a multi-use core, which provides the following facilities; work space for each teacher of the team, storage for audio-visual materials, space for use and storage of portable stage units, toilet facilities and library and book storage for those books which will be used in the programme, because team teaching involves bringing materials to the pupil rather than the pupil going to a central library. Thus the central operation of a library involves only the cataloguing and distributing of books and materials. The spaces around the core are so constructed that they are flexible and can provide for instruction in both large and small groups.

In order to provide flexible space the State Department of Education in California, through its Architectural Branch, has given much thought to the simpler types of space division, such as space determined by furniture only, the furniture being moved easily on rollers. California has several schools in operation in which a space equivalent in area to four classrooms contains four separate classes with no wall divisions at all. This permits a team of teachers to work with a large number of pupils of the same general educational level and to group them into various groups within one large general space, thereby really working as a team. Experiments there have shown that acoustical disturbances between groups within the same general area are not necessarily serious and problems associated with noise have been solved by the use of wall-to-wall carpeting.

The Dilworth Primary School in the Cupertino district of California has such an experimental four-classroom unit. The unit is carpeted throughout and only has short, low, movable partitions projecting into the room from midway along each wall. The emphasis is on openness and the entire centre of the room is left clear, providing a space for large group instruction and easy exchange of pupils from group to group. Whole walls are used as pinning-boards. The teachers were most enthusiastic and would not trade their teaching space for any other types.

## SECONDARY SCHOOLS

In secondary education today the responsibility for learning is being placed more upon the pupil than the teacher. One of the major forces at work in reshaping the educational programme and the school building is the teaching of pupils in groups of varying size. A wide variety of pupil grouping patterns is developing to fit specific kinds of learning situations and the range includes large groups, small groups and individual study.

Every time a person reads a book, magazine, or newspaper, or attends a lecture, he participates in large-group instruction. What is heard and seen by members of these large groups frequently becomes the subject of discussions with other persons, usually in groups of two to six, and sometimes motivates us to seek more information on the subject in libraries, bookstores, or museums.

Secondary schools in America today are using this adult type of teaching and learning to encourage pupils at high-school level to take a larger share of the initiative in their own education. Large-group instruction means the bringing together of pupils in a group larger than that of the average class — the size may range between 60 and 100 pupils. The basic purpose is to place them in contact with the best possible teaching. Instruction is conducted by teachers who are particularly competent, who have adequate time for preparation and who will utilize the best possible instructional aids.

The next grouping pattern is small groups. Frequently we clarify ideas and are stimulated towards further inquiry as a result of conversations we have with others. Education provides for this stimulation by grouping 15 or fewer pupils into separate classes for small-group discussions. Experience has shown that 15 is the maximum size for such groups if all pupils are to become actively involved in the discussion. These small discussion groups reinforce and use the knowledge gained during the large-group instruction.

Finally there is independent study. Each one of us today needs opportunities to learn things in our own way, to develop knowledge relevant to our own special interests, and so to become creative in what we do. In order that pupils may develop a sense of responsibility for their own learning, schools in the United States are tending to provide individual pupils with opportunities to study and work apart from the mass. These activities may take place in individual study booths, libraries or laboratories. As pupils progressively develop personal responsibility for their own learning, teachers become increasingly dispensable and independent study thus becomes the ultimate educational objective.

School planners today are endeavouring to retain the advantages associated with large enrolments, yet at the same time to provide the pupil with a sense of belonging, of being considered an individual rather than of being lost in the impersonal mass of a large school building. To achieve these aims, secondary schools are planned as a series of separate houses of about 250 pupils each. Initial enrolments usually total 750 with the possibility of increasing to 1500. Although many schools with enrolments larger than this exist, experience indicates that the administrative and financial advantages of size tend to diminish rapidly if the enrolment is more than 1500.

Each house functions as a small school com-

munity within the larger school and the pupils represent a cross-section of the total enrolment. Most of the pupil's classes, with the possible exception of physical education and industrial arts, are held in his own house. Instead of strong subject departments, each with a closely knit set of teachers, teachers are spread throughout the school and are grouped by house rather than subject. All the teachers in a house work as a team with a housemaster.

On entering the school a pupil is assigned a home room and a home room teacher who will stay with the same group throughout the high school period.

Each house provides a study space for the team of teachers, space for the storage and use of instructional materials, space for large-group instruction and small-group discussion, space for individual study and a home base for each individual pupil, while all the houses share the communal facilities of administration, physical education, library, assembly hall and certain specialized instructional areas.

### AUDIO-VISUAL AIDS

Following the concepts of team teaching and variable size group instruction there is a growing trend toward the use of such technological developments as closed circuit television, language laboratories and concept film projectors.

### CLOSED CIRCUIT TELEVISION

Closed circuit television differs from broadcast television in that it sends its signal to a limited audience. The closed circuit signal is restricted to those receivers connected to the transmitter by wire or cable, whereas in broadcast television the message is transmitted through the air from a station to any receiver in that station's coverage area. A closed circuit telecast may originate from a studio, a classroom or an auditorium. In May 1963 there were 462 CCTV installations in the United States. Of these, 266 were in institutions of higher learning and 98 were in elementary or secondary schools.

CCTV can be used either as a communications system or an audio-visual tool. As a communications system it is used for the teaching of courses, one television instructor being shared by many classrooms, or it is used to observe remote events, such as for student teachers to observe a teaching demonstration without actually intruding. As an audio-visual tool it is used chiefly to magnify a demonstration or microscopic slide so that all in the class may see clearly. In the teaching of courses by CCTV, most of the studio teachers are selected from the ranks of the best classroom teachers, with little or no television experience, and the tendency is for them to instruct on television as they would do in their classrooms, thereby maintaining the traditional classroom atmosphere.

The Byrd Elementary School in Chicago is an all-negro school with an enrolment of 2,000 pupils. CCTV is being used to teach writing, languages, mathematics and science. The school has two studios and the programmes can emanate from either of the two studios or any one of 36 classrooms. There are 72 receivers wired to the installation. In addition to the cameras for broadcasting closed circuit T.V. lessons, there are also facilities for broadcasting slides and motion-picture films. This apparatus is housed in one of the studios and eliminates the need for film projectors throughout the school.



The CCTV control room at an elementary school in Chicago. A lesson in arithmetic is being televised by two cameras. The programme controller switches from one camera to the other as the lesson progresses.

The secret of success with this type of education is team work between the television teacher and the classroom teacher. During a language lesson, for instance the T.V. teacher said, 'What is the past tense of buy? Tell your teacher', and paused. Hands went up and the classroom teacher asked a child, and, having got the right answer, the T.V. teacher, with a wonderful feeling for timing, proceeded with the lesson. The lessons of course run for only part of a period and for the rest of the time the classroom teacher carries on and expands on the television lesson. The T.V. teacher has much more time than the classroom teacher to prepare his lesson, but the classroom teacher has more opportunity to see how her students react to the T.V. teacher, to spot the slow ones and plan in a more individualized fashion for her post-T.V. instruction.

Another use made of CCTV was in teacher training. In England the Brentwood Teacher Training College has a classroom from which CCTV programmes emanate. Two cameras are fixed in the classroom, one on a wall bracket 8 feet from the floor at the back of the room and the other mounted on the underside of an electric monorail carrier on the window side of the room. The cameras have zoom lenses and the various functions of the cameras are remotely controlled from an adjacent room. The teaching block was wired to receive the television signal and three monitors were placed in appropriate rooms so enabling some 300 students to view the activities in the television originating room. By using suitably placed microphones and a halter microphone for the teacher, sound is fed to speakers in each of the viewing rooms.

An experienced teacher will give a lesson to a

number of children in this room. While the lesson is in progress the 300 students seated in their various lecture rooms are able to see how the lesson follows a plan previously made known to them and to note how the skilled teacher achieves this. The television cameras are particularly valuable in directing the attention of the viewers as by the use of lenses of different focal lengths, close-up views of pupil and teacher reactions are possible. Once the lesson is over, the lecturer and student teachers assemble to discuss the demonstration. While there the author watched an experiment being undertaken which may cause some misgivings on educational grounds, but nevertheless appeared to be successful. The lesson was divided into two parts: the first part showed the effect on the children of bad teaching, the teacher using a negative approach, with downcast eyes, and a monotonous voice. The children were quick to react and the bored expressions on their faces and subsequent efforts to amuse themselves were interesting to watch. During this experiment the principal, Dr. Shave, gave a commentary, drawing the student teachers' attention to points of interest as they occurred. The second part of the lesson began after a short break; this time contact between teacher and pupil was successfully established, and the difference in the reaction of the class was most marked.

The possibilities of CCTV seem to extend into the spheres of many subjects, but its use for teaching is still very much in its infancy and its impact will not be apparent until wider usage earns it professional acclaim.

### LANGUAGE LABORATORIES

A language laboratory is a space where

recording and playback equipment is used in the teaching of speech, literature or foreign languages. It provides opportunities for students to hear a language and to practise speaking it by responding to what they hear. The planning of these laboratories has involved the permanent provision of separate booths, each housing a tape recorder, earphones, microphone and working space for one student — all these booths are connected by cable to a teacher's console. Since a language laboratory is essentially a form of teaching aid, it does not replace the language classroom and is in fact a specialized room requiring approximately an area of 25 square feet per pupil which can be used for no other purpose.

There has, however, during the past few months been a major break-through in regard to the planning of these laboratories. In Washington a commercial language laboratory was visited that had just completed successful tests on equipment called the Transiphone. With a 'learning loop', which is a tiny wire antenna encircling a classroom, any classroom can be wired permanently for Transiphone reception and used as a language laboratory. The teacher has a portable battery operated console and each pupil has a Transiphone head-set and an 'audio notebook', which is in essence a simple transistorized portable tape recorder with only three controls. This system is capable of handling the functions of any language laboratory equipment, i.e., audio passive, where the student only listens, audio active, where he responds as well, and audio comparative, where he listens, responds, and compares. The system has also the great advantage that, if necessary, students may take their 'audio notebooks' home for further study.

#### **SINGLE CONCEPT FILMS**

Another major advance overseas in the audio-visual field has been the development of the 8 mm cartridge-loaded single-concept film projector. The film is entirely enclosed in a magazine with no external film loops whatsoever and the operation of loading the projector is simple. Sufficient film can be accommodated in each magazine to give a running time of five minutes and, the loop being endless, it can be repeated over and over again to emphasize a single concept. A rear-view projector is used; the image is projected onto the back of a built-in screen and appears much the same as a television image on a T.V. screen. Its use does not therefore require any blacking out of a classroom, thus every classroom becomes an audio-visual room.

#### **PLANNING METHODS**

The first major step in the process of analysing educational building needs is to set down the objectives of the educational programme. Statements explaining the methods of implementing educational policies are known in the United States as 'educational specifications', and they are an important contribution made by teachers and curriculum specialists to school building design. They describe in detail the methods of teaching, and the pupils' activities, whether they be in small or large groups, and the type of equipment used. They are prepared primarily to clarify the thinking of teachers concerning how and what they teach, and secondly to give architects a true assessment of the requirements for the design of a school. The development of a specific set of educational specifications for a building project should be part of a continuous

process of curriculum evaluation and its attendant space implications. This continuing evaluation is essential because school buildings and equipment are an inseparable and integral part of the total education process, and educational programmes and educational facilities can be neither planned nor evaluated as separate factors.

Some of this work in the United States is done by educational planning consultants and two such firms were visited: one, Engelhardt and Leggatt, Educational Consultants, New York, and the other, Odell, O'Connell Ass. at Stanford University, California. It was interesting to observe the scientific approach of these consultants in determining school building needs for specific school districts. Birth-rates in the area, new housing, availability of ground for housing and attendance at private schools are all factors that are taken into account. Analyses are also made of the existing school buildings in order to determine how best they may be fitted into an overall plan. These surveys enable the educational authorities to predict with some degree of accuracy the school building requirements of a specific district.

Stock plans have been tried and abandoned in fifteen states in the United States. Currently, only one state is making a drive to get stock plans used. Experience has indicated that stock plans are impracticable and in many instances over-costly. Because physical conditions vary at every site, private firms of architects have to be commissioned to prepare site plans, foundation plans and drainage plans. Thus, when using stock plans, total planning costs would not only be the fee of the private architectural firm, but also the cost incurred by the educational authority in developing and processing the stock plans. Unless a set of stock plans is kept in a constant state of revision, the user could build a 1954 type school and pay 1964 prices for it. The conclusion of the California State Department of Education, after long experience with the stock plan problem, is that stock plans are neither educationally nor economically a wise investment. Their most fundamental argument against stock plans is that they have not yet built a school of such excellence that it is worth building a second time.

The increasing pace of technological developments in all phases of the design and construction fields is causing new trends to develop in the fields of engineering and architectural services. More and more the architect is required to seek and to use specialized knowledge and the trend is toward integrated design teams composed of architects, mechanical, electrical, structural and acoustical engineers, educational planning consultants and landscape architects.

Successful school buildings today are the result of planning that was integrated in all of its facets right from the very inception of the scheme. No longer is it possible to create an acceptable educational structure by designing its various elements in isolation one from the other.

In the light of what was seen during the overseas tour, it appears that South Africa is well advanced in the design of school buildings. But, nevertheless, because of the rapid developments in education today, it is absolutely essential that architects now exploit the potential of research facilities to the full. Only in this way can we continue to provide schools that will satisfy adequately our educational requirements.



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