Assessment of Different Spatial Organizational Systems in Architecture and Spatial Configuration for Promotion of Component Spaces in School of Architecture: A Panacea for Improved Circulation

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ABSTRACT

The study analysed different spatial organisational systems in architecture and spatial configuration for promotion of component spaces in the school of architecture: a panacea for improved circulation. The function of a building in spatial organisation is to accommodate various activities and functions. Spatial configuration systems in architecture play a crucial role in determining the circulation and flow within a building or space. By carefully designing and organising the layout of a structure, architects can optimise circulation patterns, enhance the user experience, and improve overall functionality. Buildings are planned to suit a particular social organisation and activity, which implies that individuals and groups with different roles and statuses occupy different places. The spatial layout embodies the social nature of the building, through which it localises people and modulates their interaction as well as their experience of the place. Hence, the spatial component must not be disregarded but considered a significant factor in how socio-functional processes are generated. The study concluded that just as society can be recapitalized in its organisation, so can space be re-serialised. Architecture is a powerful means of directing and redirecting our attention, feelings, and thoughts to certain points through the organisation of spatial structures in large complexes like school buildings and shopping centres. The function of a building is its spatial organisation to accommodate various activities and functions. In public or institutional buildings, such as schools, museums, etc., the relationship between physical and spatial forms is a key aspect.

KEYWORDS: Spatial Organizational Systems, architecture, Spatial Configuration, Spaces, School of Architecture and Improved Circulation

Introduction

Our living spaces and the ways in which we interact with one another are structured by architecture (Hillier and Hanson, 2003). Space can be resocialized in the same way that society can be recapitalized in its organisation. The main barrier to better design, according to Hillier and Hanson, is an ignorance of the precise nature of the connection between spatial

structure and social life. Through the structuring of spatial structures, architecture is a potent tool for focusing and refocusing our attention, emotions, and thoughts. Of course, large complexes like shopping malls and school buildings are fantastic instances of this organising. Buildings allow for the exercise of power through the definition of people as different types of members and strangers, in how they interact, in how they control the interface between residents and guests, in where people and things are located, and in how their movement and visual, acoustic, and communicative paths are arranged.

The circulation and flow within a structure or space are greatly influenced by spatial configuration systems in design. Architects can optimise circulation patterns, improve user experience, and increase overall usefulness by carefully planning and coordinating the layout of a structure (Ching et al., 2014). In a spatial structure, buildings serve to accommodate a variety of activities and functions. The link between physical and spatial forms is an important consideration in public or institutional buildings, such as schools, museums, and other establishments. According to Lawson (2003), as buildings are designed to accommodate a specific social structure and activity, people and groups with different responsibilities and statuses are assumed to inhabit different locations. The socio-cultural function may take place in accordance with how both forms and places are elaborated into patterns, or spatial arrangement. By localising people and regulating their interactions as well as how they view the space, the spatial layout represents the social essence of the structure. As a result, the spatial component should not be ignored but rather be seen as a key element in the creation of socio-functional processes (Hillier, 2007).

Spatial configuration in architecture refers to how rooms are set up and organised within a structure or urban setting to maximise traffic flow and human movement. A space's overall functionality and user experience can be improved by an effective spatial arrangement. These specialised public structures, such as schools, conference centres, hospitals, etc., are made to employ space as a teaching instrument for the dissemination of sociocultural, scientific, and technological knowledge as well as the enhancement of learning ability. They stand in for the actual locations where we gather, conduct research, and study. A crucial location for young people's social development is one where they can gather with people of different ages, form relationships, and participate in activities together.

Concept of Space

It is far from obvious that space is, in some important sense, an objective property of buildings, describable independently of the building as a physical form. Most of our common notions of space do not deal with space as an entity in itself but tie it in some way to entities that are not space. For example, the idea of space is transcribed as the use of space, the perception of space', the 'production of space, or concepts of space'. In all these common expressions, the idea of space is given significance by linking it directly to human behaviour or intentionality. Common spatial concepts from the social sciences, such as 'personal space' and 'human territoriality, also tie space to the human agent and do not acknowledge its existence independently of the human agent.

In architecture, where concepts of space are sometimes unlinked from direct human agency through notions such as 'spatial hierarchy' and 'spatial scale, we still find that space is rarely described in a fully independent way. The concept of 'spatial enclosure, for example, which describes space by reference to the physical forms that define it rather than as a thing in itself, is the commonest architectural way of describing space. All these concepts confirm the difficulty of conceptualising space as a thing in itself. On occasion, this difficulty finds an

extreme expression. For example, Hillier (2007) believes that the idea of space is a category mistake made by pretentious architects who have failed to understand that space is not a thing in itself but merely the obverse side of the physical object, the vacancy left over by the building (Neufert, 2012). For Hillier, it is self-evident that space in a field and in a cathedral are the same thing, except insofar as the interior built surfaces of the cathedral make it appear that the interior space has distinctive properties of its own. All talk about space is error, he argues, because it can be reduced to talking about buildings as physical things.

Human behaviour does not simply happen in space; it has its own spatial forms. Encountering, congregating, avoiding, interacting, dwelling, teaching, eating, and conferring are not just activities that happen in space. In themselves, they constitute spatial patterns. It is because of this that spatial organisation through buildings and built environments becomes one of the principle ways in which culture is made real, and it is because of this that buildings can, and normally do, carry social ideas within their spatial forms.

Concept of Spatial Configuration

Spatial configuration is defined as a relation either adjacent or permeability between any pair of elements in a complex (Batty, 2004). Spatial configurational relations are affected by the simultaneous co-presence of at least a third element and possibly all other elements in a complex, which allows the layout and assembly of multiple products to arrive at integrated solutions. Spatial relationships can involve how components combine to make a single assembly or how items such as furniture or equipment can be placed next to each other. Bill Hillier's theory, central to the understanding of space systems, requires a description not just of individual elements of the space but of whole systems of spaces and buildings considered as patterns.

Spatial configuration, therefore, is a concept that addresses the whole of a complex rather than its parts. Intuitively, it means a set of relationships among things, all of which are interdependent in an overall structure of some kind (Batty, 2004). Spatial configuration exists when there is a spatial relationship of any type of link—say adjacency or permeability—between two spaces. It also exists when relations between two spaces are changed according to how activities relate one or the other, or both, to at least one other space.

This definition can be explained through a simple graphic example. (Figure 1) shows a cell divided by a partition into two, sub-cell a and sub-cell b, with a door creating a relationship of permeability between the two. It is clear that the relation is formally ‘symmetrical’ in the sense that cell is to cell as b is to b. The same would be true of two cells that were adjacent and therefore in a neighbourly relationship to each other. If a is b’s neighbour, then b must also be a’s neighbour. This is clearly an objective property of the relation between a and b and does not depend on how we choose to see the relation.

Now consider figures 1-b and c, in which we have added relations to a third space, c (which is in fact the outside space), but in a different way so that in b, both a and b are directly permeable to c, whereas in c, only a is directly permeable to c. This means that in c, we must pass through a to get to b from c, whereas in b, we can go either way. In c, therefore, a and b are different with respect to c. We must pass through a to get to b from c, but we do not need to pass through b to get to a from c. With respect to c, the relationship has become asymmetrical. In other words, the relation between a and b has been redefined by the relation each has to a third space. This is a configurational difference. A configuration is a set of

interdependent relations in which each is determined by its relation to all the others. Figure 2.1: Analysis of subdivided cells

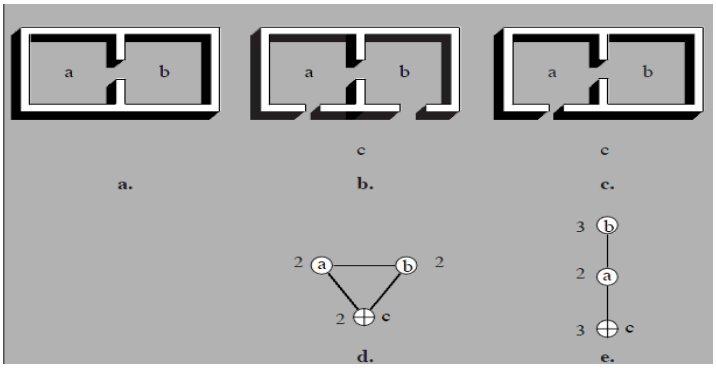

Figure 1: **Analysis of subdivided cell II, Source: Bill Hillier (2003)**

Concept of School of Architecture

According to Henry Cobb (2001), architecture schools had their origins in the United States after the Civil War with the establishment of the Tenth Street Atelier in New York. Its founder, Richard Morris Hunt, modelled the education programme on his Ecole de Beaux-Arts training. The standard for American architectural education was, however, set by William Robert Ware when, in 1868, he organised the architecture programme at the Massachusetts Institute of Technology (MIT), the oldest college of architecture in the United States. Ware spent two years surveying architectural programmes in Europe and launched an American programme similar to the German system of classroom training in engineering and history, in contrast to the French beaux-arts emphasis on design and graphic presentation.

The University of Pennsylvania began a programme in architecture in 1890, emphasising fine arts; in 1903, Philippe Cret, as head of the department, brought the strong tradition of the beaux-arts to Penn. The Penn Department of Architecture was first located on the second floor of the College building. College Hall, designed by Thomas Richards, combines separate divisions, or school wings linked by shared space, with a library and chapel in the centre. The student population grew to thirty or more students, each requiring space and a desk. One large room was made available for the architecture programme, and this served as drafting space. Shared by several classes, the resulting cross-level interaction allowed the newer students to learn from the more experienced ones.

Spatial Organizational Concepts of Building Outer Space

The purpose of structuring space is to organise and structure communication (interaction, avoidance, and dominance), so when environments are being organised, it is these four elements (space, meaning, communication, and time) that are being organised. Therefore, the environment can be seen as a series of relationships between things and other things, between things and people, and between people and other people. These relationships are orderly; they have pattern and structure; the environment is not a random assemblage of things. These relationships are also primarily, but not exclusively, spatial; objects and people are related through various degrees of separation in and by space.

Such organisations can also be seen as physical expressions of domains. In fact, planning and design on all scales, from vast regions to furniture arrangements, can be seen as the organisation of space for different purposes according to different rules that reflect the needs,

values, and desires of the groups or individuals doing the organising. Thus, environments, both spatially and through meanings, influence and reflect the organisation of communication. Who communicates with whom, under what conditions, how, when, where, and in what context are important factors in the way in which the built environment and social organisation are linked and related. Environments reflect and control interaction in its nature, intensity, rate, and direction (Allen, 2017).

In a building programme, there are usually requirements for various kinds of spaces. Ching (2003) notes that, these may be requirements for spaces that:

- Have similar functions and can be grouped into a functional cluster or repeated in a linear sequence.
- Are flexible in use and can be freely manipulated.
- Have specific functions, or require specific forms.
- Are singular and unique in their function or significance to the building organization;
- Require exterior exposure for, light, ventilation, desired views or some access to particular external features or outdoor spaces;
- Must be segregated for privacy;
- Must be easily accessible.

This could be seen as all offices will be zoned to an area, the studio spaces will be zoned to another area, the classrooms same and so on.

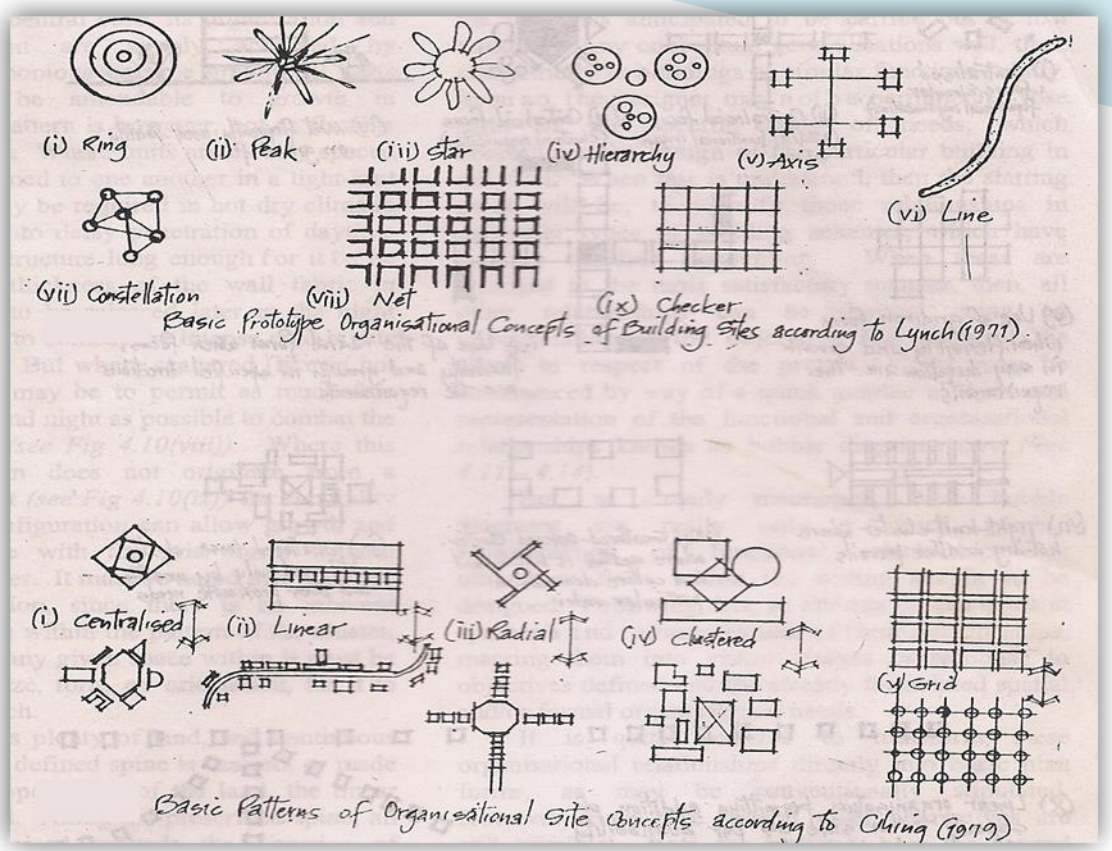

Figure 2: **Basic Patterns of organisational site concepts.**

To be able to develop an organisational concept for the design programme, attention must be paid to the characteristics and activity patterns of the users. This might reveal a set of activities organised in a defined hierarchy. This hierarchy will then offer a clue as to what might be the best organisational solution in the given circumstances. For instance, where it is found that a particular facility has the most intensive frequency of use amongst the entire organisation, this will mean (in spatial terms) that facility must command a central position, with the others placed peripherally; or if the structure is vertically organised, this all-important facility may be placed on the ground floor. The organisational concept to be used will thus be either a centralised pattern or a radial pattern. On the other hand, when flexibility is the most important requirement, say in order to leave a lot of room for expansion or change the spatial form with minimal disturbance to the whole organisation, the most likely concept to be used will be the grid, net, or checker pattern, whose modular structure easily adapts to such changes without interruption to the organisation.

Functional Design Approaches to School Building

- ***Linear Spatial System of Planning***

It essentially consists of a series of spaces directly related to one another or linked through a separate and distinct linear space (Ching, 2003). It consists of repetitive spaces that are alike in size, form, and function. It can also be a linear space that organises along its length or a series of spaces that differ in size, form, and function. In both cases, each space along the sequence has an exterior exposure. Because of its characteristic length, it expresses a direction and signifies movement, extension, and growth. To limit its growth, a linear spatial

system can be terminated by an elaborated or articulated entrance or by merging with another building form or the topography of its site. The system is inherently flexible and can respond readily to the various conditions of its site. It can adapt to changes in topography, manoeuvre around a body of water or a stand of trees, or turn to orient its spaces to capture sunlight and views. It can be straight, segmented, or curvilinear. It can run horizontally across a site, diagonally up a slope, or stand vertically as a tower.

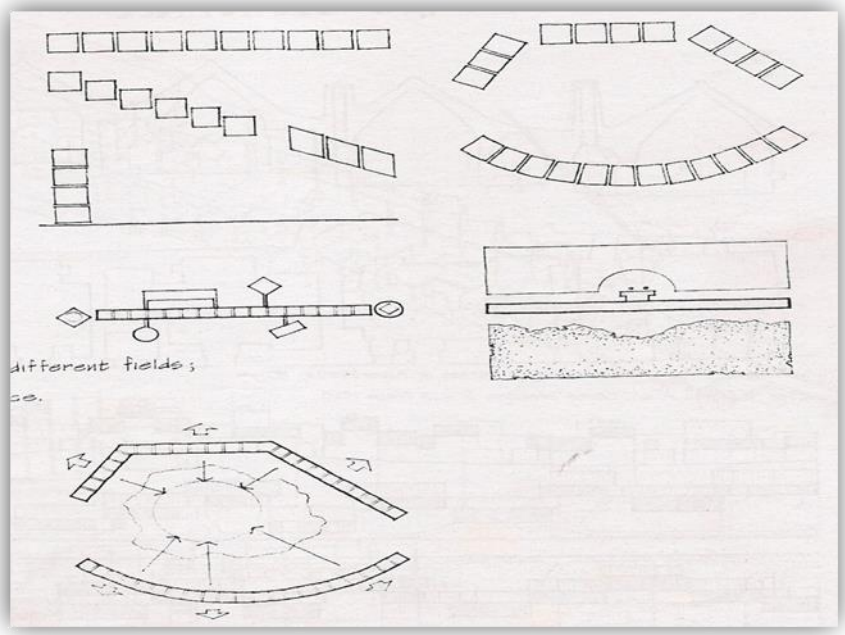

Figure 3: **Linear System of Planning. (Source: Ching 2003)**

- ***Centralised Spatial System of Planning***

A centralised organisation of space is a stable, concentrated composition of a number of secondary spaces grouped around a large, dominant, central space (Ching, 2003). The central, unifying spatial system is generally regular in form and large enough in size to gather a number of secondary spaces around it. The secondary spaces of the system may be equivalent to one another in function, form, and size and create an overall configuration that is geometrically regular and symmetrical about two or more axes. The secondary spaces may be different in form and size as a response to their requirements of function, importance, and context. Circulation patterns within a centralised organisation may be radial, looping, or spiralling in form. However, the pattern will terminate in the central space.

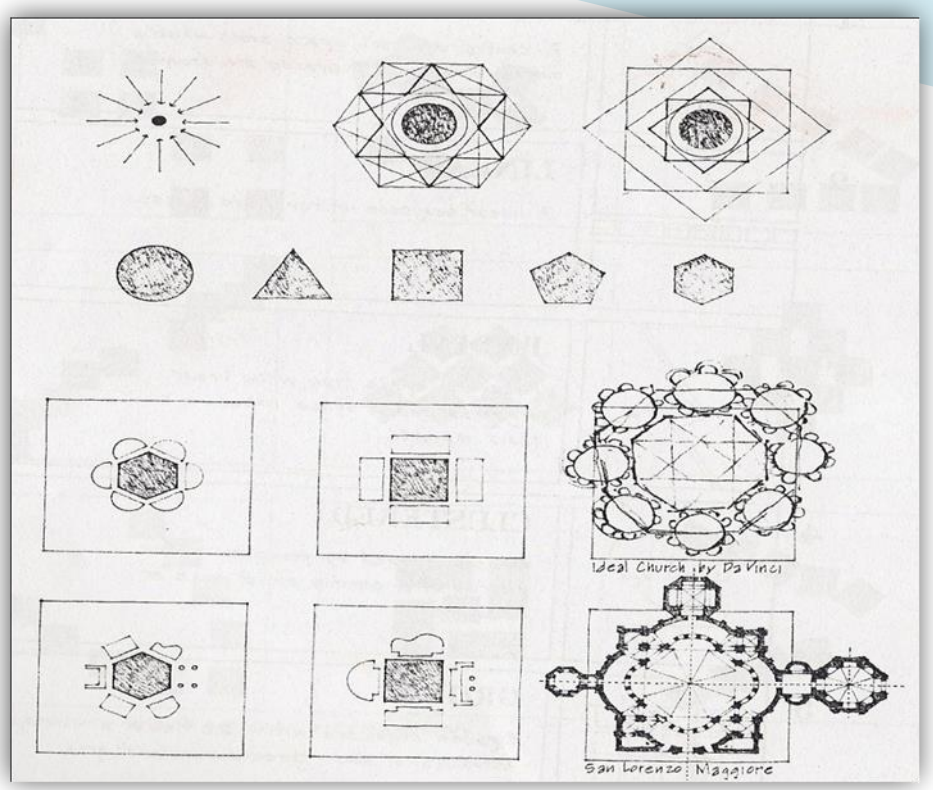

Figure 4: **Centralised organizational System of Planning. (Source: Ching, 2003).**

- ***Radial Spatial System of Planning***

It is a composition of both linear and central spatial systems. It has a dominant central space from which a number of linear spaces extend in a radial manner (Ching, 2003). Whereas a centralised spatial system is introverted, a radial system is extroverted. With its linear arms, it can extend and attach itself to specific elements or features on the site. The radiating arms can also differ from one another to respond to their individual requirements of function and context.

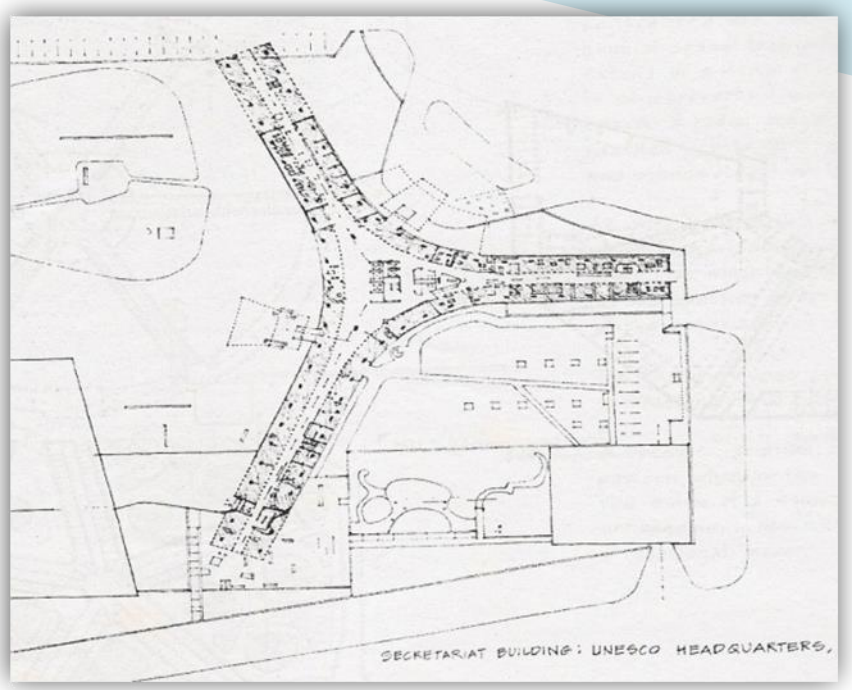

Figure 5: **Radial System of Planning. (Source: Ching, 2003).**

- ***Grid Spatial System of Planning***

It consists of forms and spaces whose positions, spaces, and relationships with one another are regulated by a 3-D grid pattern (Ching, 2003). It is created by establishing a regular pattern of points that define the intersections of two sets of parallel lines. Projected into the third dimension, the grid pattern is transformed into a set of repetitive, modular units of space. To accommodate the specific dimensional requirements of its spaces or to articulate zones of space for circulation, a grid can be made irregular in one or two directions. A grid can also undergo other transformations. Portions of the grid can slide to alter the visual and spatial continuity across its field. A grid pattern can be interrupted to define a major space. A portion of the grid can also be dislocated and rotated about a point in the basic pattern.

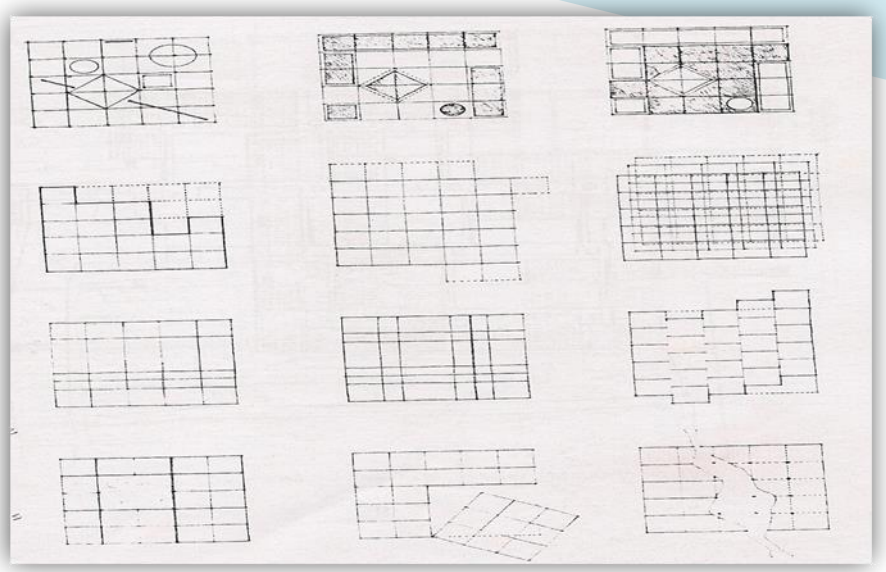

Figure 6: **Grid System of Planning. (Source: Ching, 2003)**

Conclusion

The study concludes that just as society can be recapitalized in its organisation, so space can be resocialized. Architecture is a powerful means of directing and redirecting our attention, feelings, and thoughts to certain points through the organisation of spatial structures in large complexes like school buildings and shopping centres. The function of a building is its spatial organisation to accommodate various activities and functions. In public or institutional buildings, such as schools, museums, etc., the relationship between physical and spatial forms is a key aspect. Buildings are planned to suit a particular social organisation and activity, which implies that individuals and groups with different roles and statuses occupy different places.

Recommendation

The role of spatial configuration in determining the circulation and flow within a building or space cannot be overemphasised; therefore, architecture should carefully design the structures and layout of a building.

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