

# UNDERSTANDING THE PRINCIPLES OF CONSTRUCTION

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Understanding the complexity of architecture is experiencing space, studying the culture of building and understanding urban structures. This requires several pedagogical approaches, and the age of the students has to be taken seriously into consideration. The younger, the more experience based, the older, the more analytical based, but the real pedagogical challenge is the in-between, the adolescence.

If young people at this age shall achieve a growth in understanding of our man-made physical environment, there is a time for physical experience and activity learning. The adolescence is the period when feet outgrow their shoes, bones outgrow their muscles and sinews, and clumsiness can't be concealed. The youngsters become unapproachable to adults – they are: *Closed due to reconstruction.*

The pedagogical source is the history of architecture. Not only taking a look at it, but building it, and experience the constructions by being part of them yourself.

## INTO ARCHITECTURE

We build a gothic cathedral, the Eiffel tower and a Mongolian yurt. We draw and discuss pedagogical implications. The workshop is set up for building and construction activities which in themselves provide an experience of architecture with various materials, structures and spaces on a relatively large scale. At the same time the structures which materialize are genuine representations of the basic principles of architecture and of seminal works in the art of building.

The workshop is a sort of indoor construction camp with a supervisor, the pedagogical essence being that the participants form part of the structures with their own bodies. “I understand great architecture because I have helped build it myself and my body has experienced forces of pressure and tension, the basic forces in all construction.” We experience statics in our arms and legs, the varying interaction between pressure and tension – push and pull.

## BODY WISE

However, if you do think about buildings and forces and want to examine them closer by deconstructing the house, then they are already gone. These static forces that surround us in everyday life cannot be experienced or perceived directly. But we might sense them at work in our own bodies; we feel the weight carried by our legs and the floor pressing against the soles of our feet.

The skeleton carries the compressive forces and the muscles handle the tensible forces. So, it is by analogy with our very own bodies we experience this hidden world of constructive forces. Statics, the varied interaction between tension and compression, is in our very legs and arms.

The first important point is that the construction takes place on a large scale so that the building itself becomes an activity requiring cooperation and testing out in groups of 20 to 35. The essence of this activity-based teaching is to give experience of the fundamental concepts of architecture through direct participation. As a pedagogical concept it is not so unlike glacier hiking with a guide, but in this instance it takes place indoors, perhaps in a gym hall.

The second important point is the choice of construction processes which not only are self-explanatory group activities involving various different materials, but which also represent principal concepts of construction technology and key buildings from the history of architecture.

The third point is that the workshops focus on activity which requires the combined cooperation of an entire school class, clearly illustrating the parallel that all architecture is an entity consisting of many interacting parts.

## TEACHING ARCHITECTURE

It is a new idea that children should learn about architecture. Most of the existing information and teaching material on architecture is aimed at adults. One possibility is to instruct children through their own physical experience of the principles of architecture.

Until recently the building trade has not been especially concerned with children, and there is little contact between schools and architects. Unlike, for example, musicians, artists and craftsmen, very few architects become teachers. Also, it is not obvious how one should approach architecture as a school subject.

Architecture is an all-embracing topic and yet it has hardly ever been discussed which aspects of architecture would be meaningful to introduce to school children. In school text books architecture has appeared in the form of illustrations of the different stylistic periods of art history, but as a subject in its own right it has a very short history.

Children grow up to be responsible citizens who will make decisions regarding the shaping of the environment. It is this perspective which has been most important in justifying the introduction of architecture as a school subject. But the question of whether architecture should also involve practical experience and skills has barely been discussed. A reason for this is possibly that it is difficult to envisage how these aspects of architecture might be taught, and what the course should contain.

To date, children have not been the main target group for information about architecture. Target groups have largely consisted of relevant academic circles and, to a certain extent, the informed public. Architect students have been taught and given the opportunity to practise their skills, while all others with an interest have for the most part just received information.

## ARCHITECTURE – A SUBJECT FOR INDIVIDUAL DEVELOPMENT

As a school subject architecture might be compared to the relatively new field of ecology. In order to understand ecology we must first study plants, animals and humans. Through investigating various phenomena in nature, and themes such as context and dependency, and even solidarity, an awareness and understanding of nature and our place in it can be gradually achieved. An understanding of ecology requires of knowledge of what happens in nature. This cannot be taught directly; much of this understanding comes later, the fruits of general studies

over time. In the same way that ecology can be described as a comprehensive understanding of nature, so might architecture be described as a broad subject, in which understanding develops over time. Architecture, which arises when several spatial elements interact, is in essence more than the sum of the combined building materials. In order to gain an understanding of architecture it is necessary to study the functional and constructive qualities of each type of material, and to learn how they interact in various combinations. All spatial structures exist within a greater technological, social and aesthetic context, which indicates that the understanding of architecture rests on a broad base of knowledge.

### ARCHITECTURE AS AN EXERCISE IN SKILL

If one is to achieve a gradual growth in the understanding of our man-made physical environment, there is most likely a need for teaching with an approach based on physical experience and activity. After a while intellectual and contextual elements are introduced.

The teaching of architecture will to a certain extent have two aspects: the first is one of orientation, observation, reflection, reproduction etc, and the second consisting of drawing, building, experimenting with materials and developing skills and experience in working with three-dimensional spaces on a scale large.

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We have perhaps come closer to the answer to why architecture should have a place on the school curriculum and what the approach to teaching it might be. One proposed outline of how the theme of architecture might develop through the school system is as follows: At junior school level the teachers may approach teaching architecture through activities such as

building huts, models, and geometry and mathematics in general. Local history studies can be expanded to include studies of the environmentally founded, functional architecture of the homes of indigenous peoples, the homesteads in all their optimal variety of forms.

Upper secondary school is the time to examine architectonic relations, approaching an awareness of the complexity of modern urbanity. Perhaps it is even possible to achieve a sense of humbleness and admiration for what human beings before us have achieved in the way of outstanding buildings.

During youth however, that period of physical transformation when we adults often find young teenagers difficult to get through to – as if closed for rebuilding – perhaps the world of construction might be an arena for a more dramatized participation. As an approach to the theme during this particular phase of life technology has often proved more fruitful than aesthetics. When hands and feet are growing their fastest, when bones are outgrowing muscles and tendons, and a young person's feeling of temporary clumsiness and heaviness is not to be hidden, that is the time for close combat with the forces of pressure and tension.

## LIVING ARCHITECTURE

Have we come closer to the aims of teaching architecture when it comes to giving the children what they need in the way of nutrition along the way in their growth and development? At the architecture workshop we experiment with creating spaces where the pupils themselves form part of the construction. In my experience these common activities, which have the character of an expedition whose method is participating observation, can achieve considerable pedagogical results. These events can give unforgettable moments, which an entire class has experienced together. This living architecture cannot exist unless a large group of people act together. Teachers know that youths, to a certain extent, have to learn afresh how to observe, and that in the course of their activities at the architecture workshop their perception of their physical surroundings may have shifted a little. The pupils learn to view their body as an instrument, not simply as an attribute. Through our body we see our environment in a different way, while at the same time our body is our closest environment. The endless diversity of our body is an inseparable and costly aspect of the world's manifestation.

It is the teacher's knowledge of what gives cause for enthusiasm and the desire to work in their pupils that is the most important ingredient.

