FUTURE SCHOOL

- Designing With Children

Author Sini Meskanen Editor Helena Teräväinen

Based on Sini Meskanen’s Master’s Thesis in Architecture

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Part 1

Typologies for the Future School

Introduction

Kaapelitehdas - Cable Factory

Collaborative planning and design constructing children´s epistemic agency

It is most important, even crucial, for people's well-being to deal with the decisions concerning their own environment. The group which is usually forgotten even in the most collaboratively arranged urban planning and design processes are the children.

The research project called InnoArch, Places and Spaces for Learning, belongs to a transdisciplinary InnoSchool consortium aiming to develop a set of research-based good practices, processes, models and designs for the Future School Concept.

InnoArch focuses the research at two main goals: first to deepen the understanding of the interrelationship between a spatial experience and meaningful learning process; and then to develop a collaborative, inquiry based planning and design process for the future school. The research project has several substudies which are dealing at different physical and virtual levels: building design and architecture, neighborhood design and global networking.

The pedagogical idea based on inquiry-based learning encourages to strengthen children's (pupils) epistemic agency in the local community and to empower them to be active stakeholders in it. We invited pupils to take part in the planning and design process by developing methods to find out what kinds of places and spaces attract them and why.

Our research questions are pointing on two directions: In what ways can the collaborative planning and design process with children act as a tool for active citizenship and cultural learning?
In what ways does children's environmental local knowledge enrich urban planning?

Several sub-studies have been carried out with pupils to produce data of their environment by different methods and this paper is aiming to describe one of them. In the substudy at Arkki (School of Architecture for Children and Youth), several planning and design workshops were organized for children to examine their visions for a better future school.

Students in two age groups (7-11 and 12-18) were producing ideas of their own in scale models, texts and drawings for the school building and the environment. The workshops were documented in photographs and videotapes. The main idea of the workshops has been to ask: What would children do, if they had a chance to design a school building?

In this book we are describing the study made at Arkki School and the typologies of the future school which Sini Meskanen discovered in this research and presented in her Master´s thesis in Architecture Spring 2008 at the Department of Architecture, Helsinki University of Technology.

Future School Workshops & Curriculum

Workshop	Date	Topic
1. Workshop	25.9. & 26.9.2007	From Own Experiences to Inspiring Space
2. Workshop	2.10. & 3.10.2007	Own Space and Learning Space
3. Workshop	9.10. & 10.10.2007	Learning Space Groups and Clusters
4. Workshop	23.10. & 24.10.2007	Common Spaces in Future School
5. Workshop	30.10. & 31.10.2007	Meeting Places in Future School
6. Workshop	6.11. & 7.11.2007	Specialized Spaces in Future School
7. Workshop	13.11. & 14.11.2007	Clusters & Patterns
8. Workshop	20.11. & 21.11.2007	Outdoor Spaces and Roof Gardens
9. Workshop	27.11. & 28.11.2007	School Appearance; Layout, Plan, Ground Plan
9. Workshop	11.&12.12.2007	Perspectives, Scale Models
Final seminar	19.12.2007	Discussion and analysis of the results. Photos.

Future School – workshops were held in the fall 2007 at Arkki (School of Architecture for Children) in Kaapelitehdas, Helsinki. Two groups of 12 students each were assembled once a week for the entire fall semester, totalling 21 gatherings. The students were aged between 9 and 18, but the other lesson series was also participated by a younger, 7-9-year old children's group.

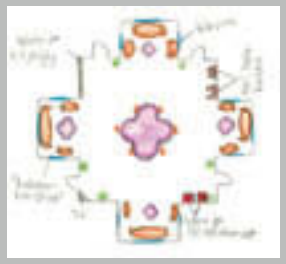
In the curriculum of Future School -workshops the school and its surroundings were divided into nine different themes. The research was taken further towards school of the future through analysing the students' schools of today. The analysis started from smaller, more private spaces gradually developing towards larger spatial groups and spaces. According to the principles of inquiry-based learning, the students built their understanding on what they had learned from previous stages by gradually moving towards larger spatial entities. Fall semester ended with a seminar in which the teacher Sini Meskanen, student of architecture, and researcher Helena Teräväinen, D.Sc.(Tech), Architect, also the advisor of thesis, discussed and analysed the plans and the work done with the students and their parents.

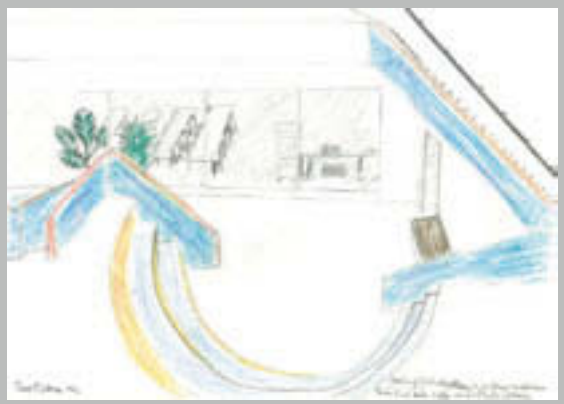
Sini Meskanen, at the time a student of architecture, presented a theme in the beginning of each workshop. She had been collecting pictures and questions from international sources, from researches and literature that addressed school architecture and trends of today and of the future. Workshops were linked to the future trends through questions and ideas. Historical evolution from past to present in working methods, tools, information, communication, student profiles and teaching methods was given consideration. Then it was considered whether school buildings should evolve too, and if so, how and what should change. The day's theme was discussed and the students presented questions and comments. Some questions were chosen to support the design work: What kind of spaces are intriguing, interesting and promote learning? What colours, shapes, materials and atmospheres are interesting and promote the learning experience?

Students worked independently with the design tasks given. They drew layouts, projections, perspective images and sections according to their own interests and purposes. The students also wrote notes on their ideas and observations on spaces and their usage. The older students produced sketches in each workshop, varying their own themes; whereas the younger students seemed to prefer scale models as their means of self expression.

As the workshop went on, the students discussed their work with each other and with the teacher. In the end of a workshop each student presented his work to the teacher and other students as the researcher videotaped the discussion. During the interview the students had a chance to develop their epistemic agency and by words increase others' knowledge about their designs. Both the teacher and the researcher wanted to give the students a chance to be heard and understood by letting them explain their designs themselves. The produced imagery was accompanied by the respective explanations, linking interpretations to the subject at hand. The workshops therefore emphasized the meaning on interaction and participation, the process itself, as equally important to the actual designs.

1 From Own Experiences to Inspiring Space





Own Experiences

The first workshop analyzed the students' present school buildings. The students thought of ways to transform them to meet both the modern standards and those of the future. One of the key findings was that the school buildings required more light and space. Rooms should be more spacious and more comfortable with bigger windows allowing much more natural light to come in. Dark walls were found considered undesirable since they absorb all the light and cause dark reflections. Long and dark corridors were also disliked. Dining rooms were found needing a more spacious appearance by adding windows and some room height. More space was needed also outside the classrooms: niches, benches and deep window boards were considered pleasant for socializing and spending time.

The students found their schools needing a more comfortable and visually pleasant appearance. The buildings should be "more modern, like a space center". Technology was seen as the key factor: There should be more computers, preferably one (personal one) for each student. Also more places for social interactions, resting places and sofas were sought after. Computers were considered desirable to have also in social spaces. It was stated that school environments should be greener with featuring plants in every room.

In students' opinion the schools should be more fun – apparently meaning both the buildings and the activities provided. The yard in the school premises should be made greener and more pleasant, with nice benches instead of just climbing racks (though the latter was seen important as well as they support play and exercise).

The students understand the meaning of air conditioning and general healthiness of the school buildings for their learning. Also making schools more pleasant in general is seen to promote learning. School buildings, as the students see it, should offer something new and spectacular. What could it be?

Delightful & Inspiring Space

In general, the students seemed to think that the overall comfortability of the school buildings left a lot to hope for. So what would a comfortable and pleasant space be like? The students imagined these own and inspiring spaces - their colours, materials, shapes, lights, shadows and rhythm – in their drawings.

Many students defined pleasant space to have sofas, comfortable chairs and other comfortable social spots like stairs and platforms. Pleasantness in space was described with soft shapes, colourful surfaces and light. Multi-use abilities in spaces, learning modules and relaxing places for individuals and smaller teams were also considered important.

An inspiring space was seen to consist of lots of plants, green elements and light. Also ability to listen to music as well as spaces for theatre and other performing arts were seen as inspiring. Technology was also included in the description of an inspiring space: interactive whiteboards, data reflecting walls and computers for each student.

Workshop - From Own Experiences to Inspiring Space

Own Experiences

How should school buildings change / evolve?

- **Lot of space and light (most common)**
- **Large windows, skylights, glass walls – light, connection to nature**
- **Colours are important**
- **Plants and nature were seen considered interesting – even inside the buildings**
- **Modern technology should be present at schools – interactive whiteboards, screens, data reflecting walls, electronic paper, personal computers**
- **Modern, beautiful and comfortable are some of the most common ideals**
- **More spaces for leisure and relaxing**
- **Round and organic shapes were considered interesting in design of spaces and furniture**
- **Connection between nature and the building also came up**

Inspiring Space

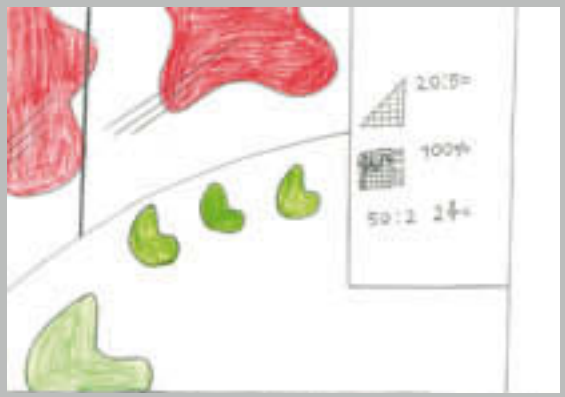
Inspiring / pleasant space

- **Sofas, comfortable chairs and platforms for relaxation**
- **Relaxing spaces for small groups**
- **Learning spaces for individuals/small groups (learning modules)**
- **Soft shapes, colourful surfaces**
- **Lamps and light**
- **Computer spaces for spare time**
- **Indoor plants and nature**
- **Soft shapes**
- **Screens and data reflecting walls inside classrooms**
- **Stairs or platforms for spending time, multi-use capabilities**
- **Possibility to listen to music**
- **Spaces for theatre and other performing arts**

2 Own Space & Learning Space

What will learning be like in the future? Where will learning take place in the future? What will learning space or a workstation be like?

Thumb rules were given to assist in the drawing assignment: What are the colours, materials and shapes like in consisting spaces? What about rhythm, lights & shadows?



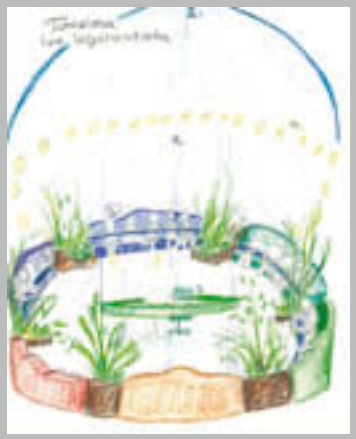
Own space & Learning Space

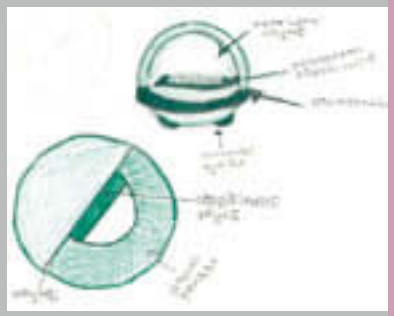
School building with all its facilities is a large complex with a large and complex room program. Series of workshops was constructed in a manner in which the students could approach the broad subject from their own scale and proportions. Children's architectural education is based on the scale and proportions of their own bodies and the spaces that suit those. Therefore the entity of school's facilities was now approached starting from "individual spaces" and the future one- person-workstations. Besides, user-orientation is nowadays considered important in all design, including architecture, so children (or students) should not be considered any less important as a user group than any other. This is why this project aims to emphasize the viewpoints and experiences of children and students as describing the future of school design.

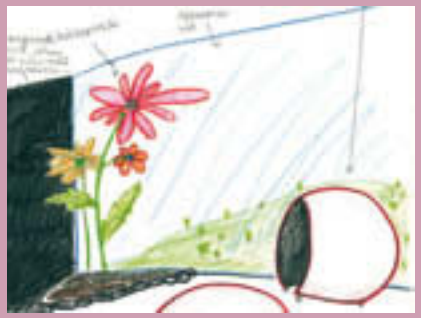
The students wanted that space itself and architecture could be seen as an instrument of learning in the future. The fact that spaces should be designed on the basis of their function was pointed out in several works. Shape and nature of the space were considered important as they strongly affect the emotions and atmospheres the space projects. Using sky and space -themes as elements in ceilings was considered fascinating by the students. Technology was naturally considered to play a big part in the learning space of the future: This includes interactive whiteboards, walls and other surfaces; different kinds of screens; transparent and reflective surfaces, and integrated technology inside walls and structures. Own personal laptops and modern fogscreens were placed in learning spaces by many of the students. Information should be at hand always and everywhere so that it can be both searched and used in knowledge-building. Often the optimal shape of a learning space was considered to be a dome of some sort. This way all the walls and ceilings could be used for learning, for example for projections. Round shape was repeatedly suggested to be used in learning spaces, often such that the teacher could stand in the middle of the room. Art and colours were integral themes in the learning space of the future, in which green plants were also frequently required. Transparency from one space to another was considered important, as well as the fact that different functions should be located on different levels and platforms.

Overall flexibility and multi-use capabilities were considered important both in learning spaces and in furniture. Learning space should be dividable with a smaller, more relaxed space in it for individual and small team work, with comfortable soft furniture and pillows. Most of the students imagined the interior design and furniture to be quite futuristic. Individual workstation's function could also be seen as a quiet room for reading or as a small space for relaxation close to the classroom. In separate spaces sofas, pillows and overall comfortability was considered important. Often a workstation was described as a learning module, featuring integrated laptops, microphones, speakers, desk, chair and other necessities. These learning modules were often described as flexible, adjustable, mobile and unfolding. Some students considered learning modules to be a combination of furniture, some as small spaces in which to sit in. Learning modules were also described as resembling a bubble or a ball chair. They also had semi-seatable furniture that could be adjusted as chairs. Computers in these learning modules had often touch screens in them. Relaxing learning modules were also suggested to be located outdoors.

Workshop - Own Space & Learning Space





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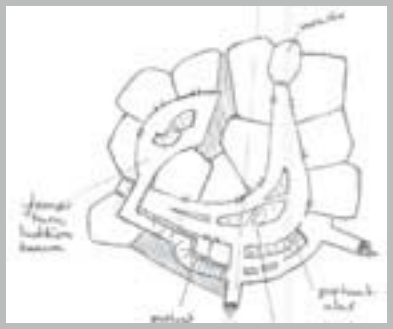
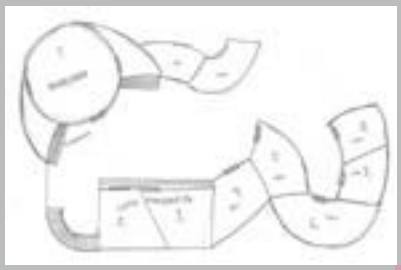
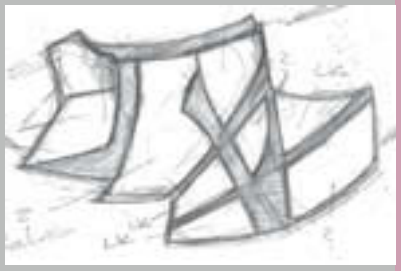
3 Learning Space Groups & Clusters







Learning Space Groups & Clusters

The students reflected how individual learning spaces would be located and what kind of groups would they form together in the school of the future. What will a group of learning spaces (cluster) be like in the future?

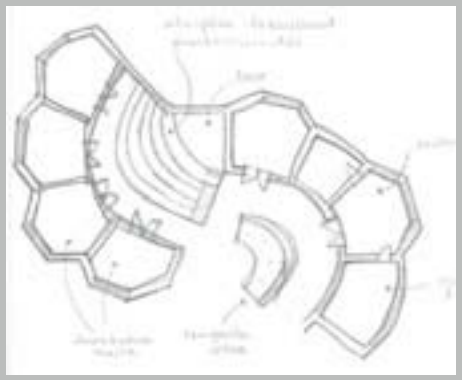
Thumb rules were given to assist in the drawing assignment: What are the colours, materials and shapes like in consisting spaces? What about light, shadows & rhythm?

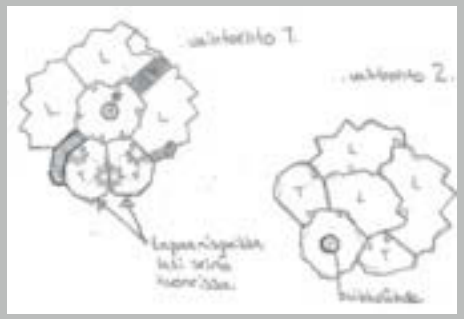
Meandering, morphological and organic shapes were often seen part of the learning spaces and their combinations, clusters. There were a lot of interesting formations of irregular learning spaces and the supporting common facilities between them. One of these was described a model resembling a honeycomb (hexagonal cells), where learning spaces were organised in a honeycomb-like manner forming interesting lobbies in between spaces. Students also experimented on fitting the groups of learning spaces in spherically shaped cells, as well as dividing these round clusters into edged learning and common spaces. Positioning of learning spaces was thought through both vertically and horizontally.

Several students grouped the learning spaces around a large atrium, in several floors. These spaces were also vertically interlinked in many of the students' works. Organization in multiple levels was a common idea concerning learning spaces – the spaces often had balconies and were divided into different functional sections also vertically. Many of the proposed learning spaces were adjustable and could be divided or combined with adjustable wall structures. Shallow spaces within taller spaces, stairways rising up to the roof and the use of these stairs and the roof as a learning space were suggested in many of the works. The spaces were suggested to incline in height gradually, making the entity interesting. Spaces between learning spaces were often pictured as high spaces, with bridges, stairs and different platforms crossing it.

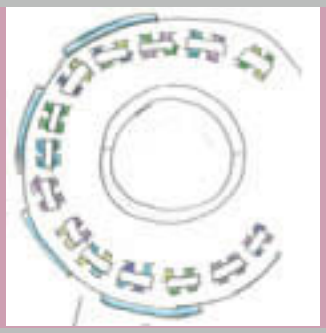
Many of the works featured a direct connection to nature straight from the learning space. Space between learning space clusters was often divided into either covered or open courtyards; they might have had plants, aquariums and other water elements. School's rooftops were often portrayed as learning spaces also, with roof gardens and terraces.

Workshop - Learning Space groups and Clusters





4 Common Spaces
in Future School



Common Spaces In Future School

What are common spaces like in the future school?

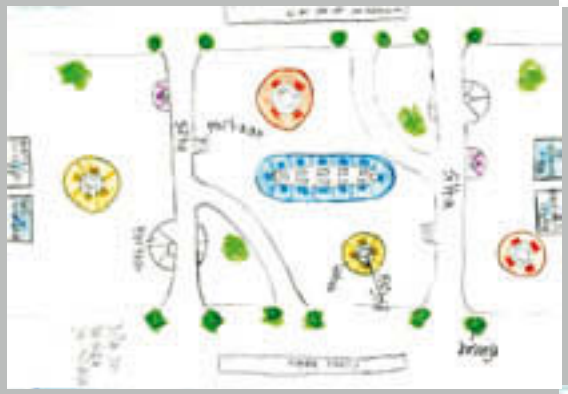
Thumb rules were given to assist in the drawing assignment: What are the colours, materials and shapes like in consisting spaces? What about light, shadows & rhythm?

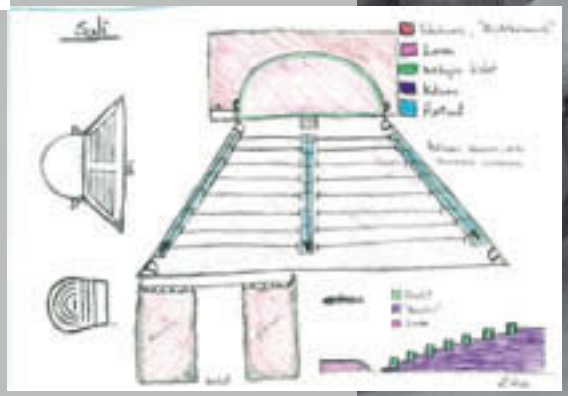
In common spaces, especially lobby areas, the students valued spaciousness and height. In high spaces different floors and platforms were combined with bridges. Different kinds of 'hangaround' – stairs and -platforms and transitions between them, balconies, niches and elevated platforms were presented in several students' suggestions for common spaces. Smaller spaces for sleeping and relaxing and sofa groups were used as space dividers. Round shapes were popular once more. Colourful furniture and surfaces were seen as important details.

Technology played a major part also in the common spaces. Lobby areas had different kinds of screens and fogscreens placed in them – therefore common spaces could be also used as learning spaces. Lobbies were often designed with shared mobile workstations: either learning modules or computer stations. Different kinds of reflections and moving pictures on the walls seemed to inspire the students. Common spaces were often designed with flexible and adjustable features so they could be used as auditoriums too.

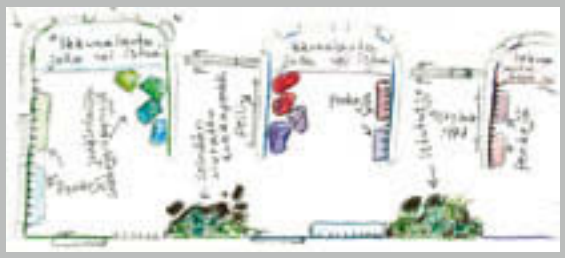
An important factor was to bring plants and nature in common spaces. Also the direct connection between the outdoors and common spaces was emphasized. This was enabled with glass walls that could be opened, connecting and intermingling indoor common spaces with the nature outside. Courtyards and terraces in the middle of the building also enabled a connection to the nature straight from the common spaces. Social places were often positioned outdoors. Both the common spaces indoors and those outside had lot of water elements and plants in them.

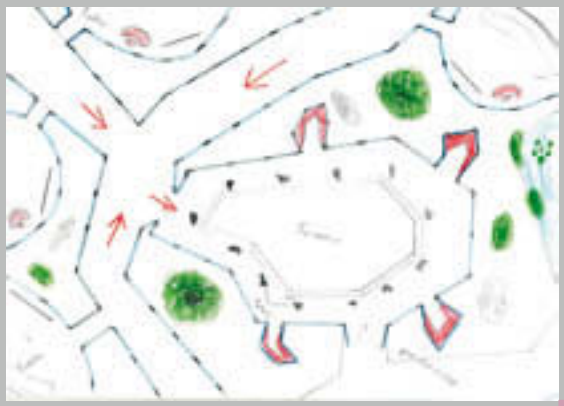
Workshop - Common Spaces in Future School

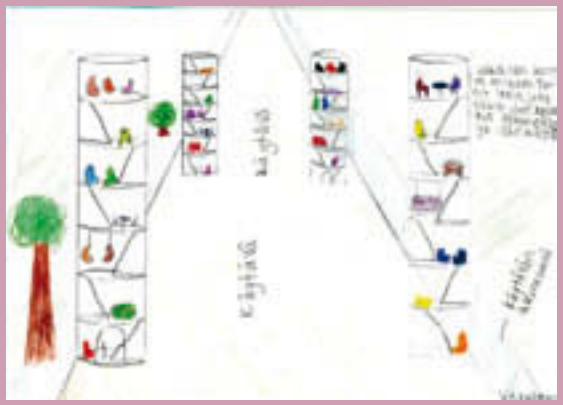




5 Meeting Places
In Future School







Meeting Places In Future School

What are the meeting places like in the future school? Why people gather and meet each other at some specific places? What makes these places so pleasant for social interaction?

Thumb rules were given to assist in the drawing assignment: What are the colours, materials and shapes like in consisting spaces? What about light, shadows and rhythm?

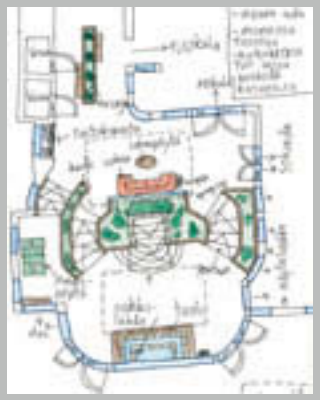
Meeting places are normally formed in the intersection points of people flow. Students found the central locations important compared to other space types – meeting places have to be easily and quickly accessible from everywhere. However meeting places are preferably situated apart from the people flow – as a solution the students suggested meeting places to be located on different levels, for example on bridges, balconies and elevated or lowered platforms. Meeting places have to be multifunctional and diverse. Round shapes were emphasized once again.

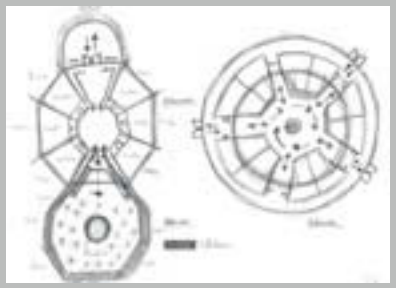
The students felt need for several meeting places of different types and shapes for varying purposes. These places include lobbies and corridors, school cafeteria, courtyards and separate spaces for spending free time. In some cases, the series of meeting places constituted of lobbies that were surrounded by small learning spaces. In some occasions the meeting places were situated vertically above each other – into different three-dimensional structures in space. Also a cafeteria or other comfortable venue was considered as an ideal meeting place.

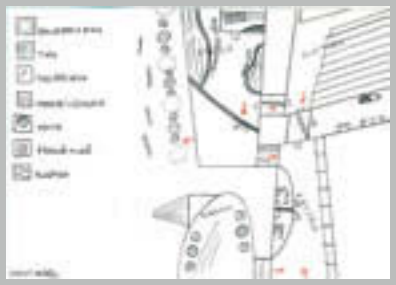
In several student works the learning spaces were situated around the meeting places. In other works the meeting places in the lobbies were placed around a courtyard, which was also seen as an important meeting place. Courtyard was seen as an excellent meeting place since it connected to surrounding spaces through glass walls and terraces. Courtyards therefore create a series of spaces where there are meeting places between courtyards or a continuum of meeting places. Even in the courtyards meeting places were separated from the people flow by situating them on different levels. Sometimes there were separate buildings - green houses - suggested as meeting places at the courtyard. Edges of different planting areas in the courtyards served as seats and therefore created ideal places for meetings. Elements of nature were also brought indoors to decorate meeting places, for example trees with benches, water themes or aromatic plants surrounding them.

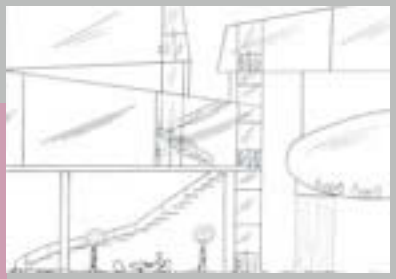
Meeting places were seen as having furniture that could allow the students to 'hang out', such as sofas, different kind of benches and seats and soft modules that could be used to create varying interior elements. In their works, the students presented meeting places to have different kinds of reading nests, niches in which to hang out and other spaces for different purposes such as relaxing, socialising and studying. These spaces were pictured as having glass walls, low walls or being located on different layers with 'social' stairs leading to them. Sometimes they were pictured as mobile. A performing stage or a comparable installation was suggested to support spontaneous performances or other kinds of social events.

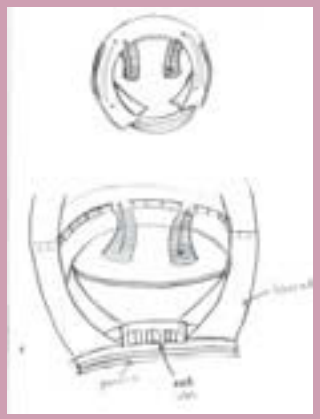
Workshop - Meeting Places in Future School

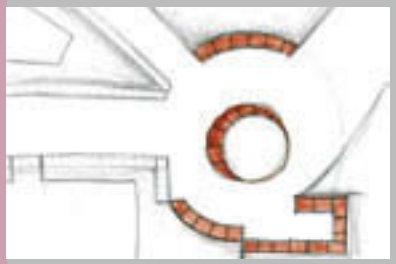


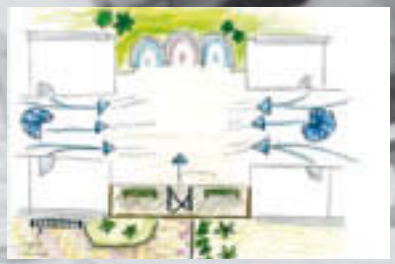




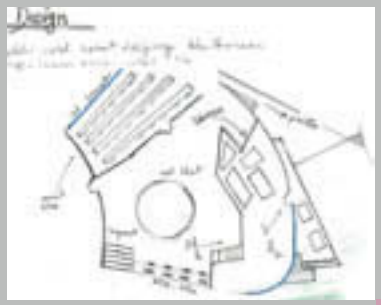


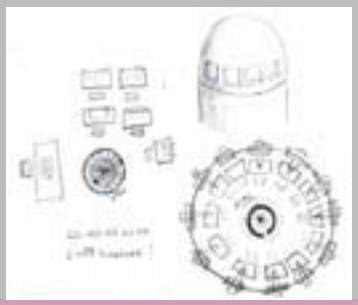


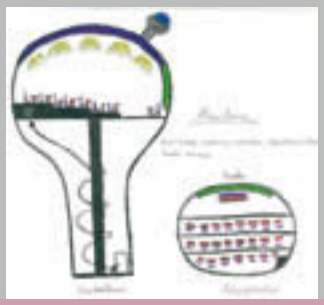




6 Specialized Spaces
In Future School







Specialized Spaces In Future School

What are the school subjects like in the future? What new subjects can we have by combining the ones we have today? In what kind of spaces are these subjects studied?

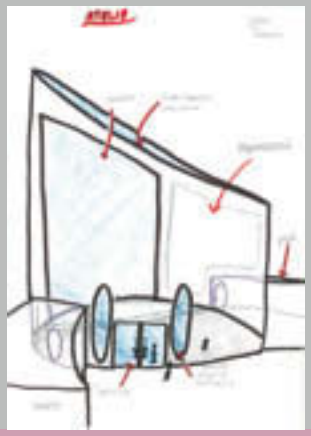
Thumb rules were given to assist in the drawing assignment: What are the colours, materials and shapes like in consisting spaces? What about light, shadows and rhythm?

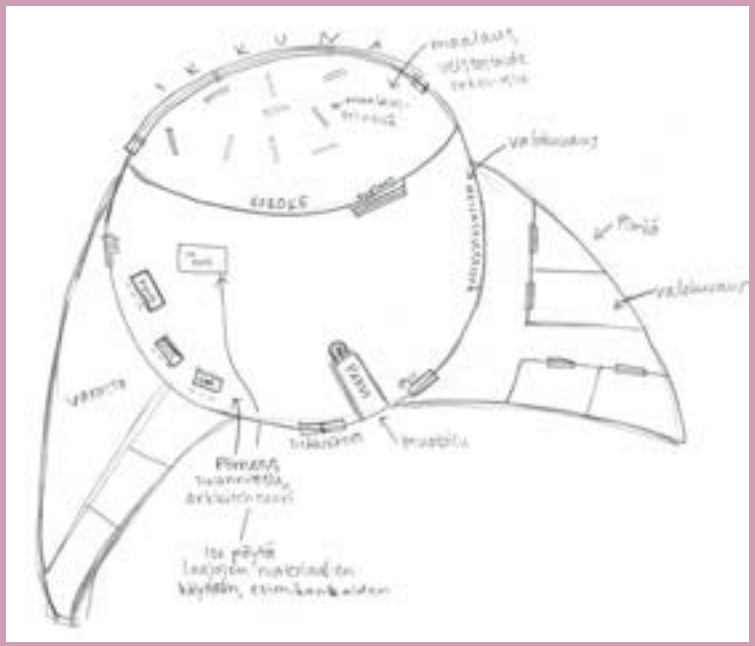
The students brainstormed some new subject combinations: physics-astrology, design (as a combo of visual arts, woodworks, handcrafts, mathematics and information technology), technology (as a combo of mathematics, physics and information technology), architecture (but of course!), medicine (as a combo of biology, physics and chemistry), cell biology, survival skills, industrial design, product development and lot of different subjects requiring creativity.

Planning special classrooms for these new subjects made the students' imagination flow. Spaces for design would require facilities for many kinds of design work: there should be a darkroom, tools and facilities for both metal- and woodworks. In addition to this, there should be equipment needed for design and handcrafts (both sewing and woodworks) as well as a showroom to display the work done; and even hologram desks were suggested. There should be different processing stations for computer work, laboratory work and for work made by hands. Therefore the design spaces were divided into several sections, often into several levels. It was noted that larger projects would require larger storage rooms. Large windows and skylights were required in the atelier parts of design spaces to maximise natural light. Design space was in some cases suggested to have glass walls and in some cases it was situated on the rooftop, in which case also the roof would be considered learning space. Specialized spaces for creative subjects were frequently suggested to form creativity clusters, thus enabling different kinds of synergies.

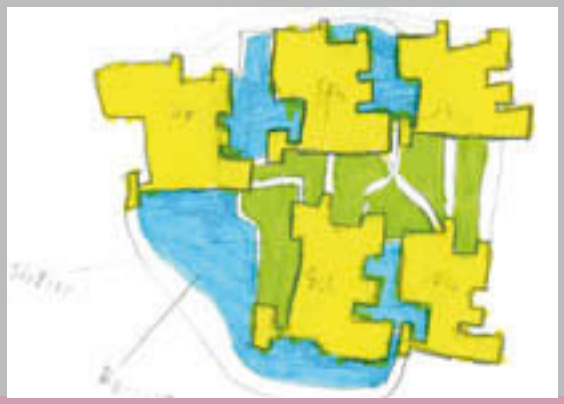
As for astrology, there should naturally be an observatory, or at least a specialized space that resembles one: There should be telescopes, hologram desks, various screens for demonstrations and projections as well as equipment with which to communicate with satellites. This way the students would be able to research the space as it is. For space biology there should be a vacuum closet for researching and studying materials. Science spaces should have different kinds of desks for experimentations, as well as a table for "making inventions". Science spaces were without exception equipped with research laboratories. Laboratories were equipped with the latest technology, such as diagnostic equipment, interactive boards, screens and walls for projections. Laboratories were frequently described as having glass walls and thus connecting to the surroundings. Therefore the exciting research would be made visible to others as well as enabling the students in the lab to observe their surroundings.

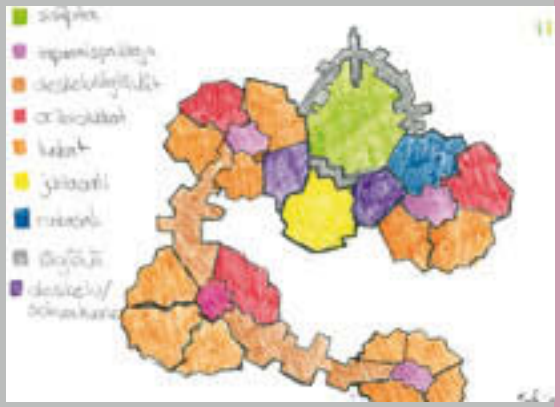
Workshop - Specialized Spaces in Future School

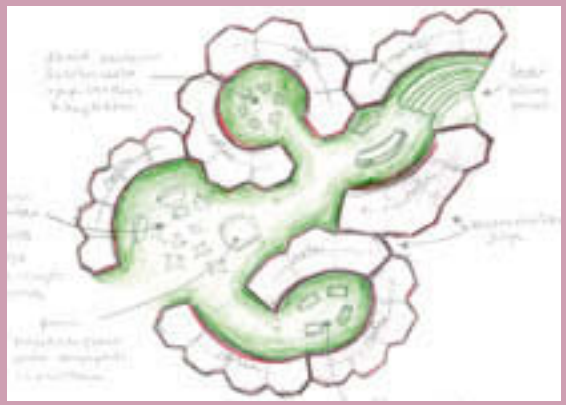




7 Clusters & Patterns







Clusters and Patterns

How are groups of class rooms, specialized spaces and common spaces; clusters, related to each other? How to group learning clusters? What kind of spaces the clusters form? What kind of buildings and constructions are created? What are the places for learning like?

Thumb rules were given to assist in the drawing assignment: What are the colours, materials and shapes like in consisting spaces? What about light, shadows and rhythm?

Learning spaces, specialized spaces and common spaces (clusters comprised of these spaces) were situated in several works freely to the sides of an avenue, plaza or piazza. In the centre there was a lobby, a theatre, school cafeteria, covered courtyard – or a combination of all of these. As the cluster had formed around a piazza, common spaces appeared versatile, as if a shared space for the entire school for events and gatherings.

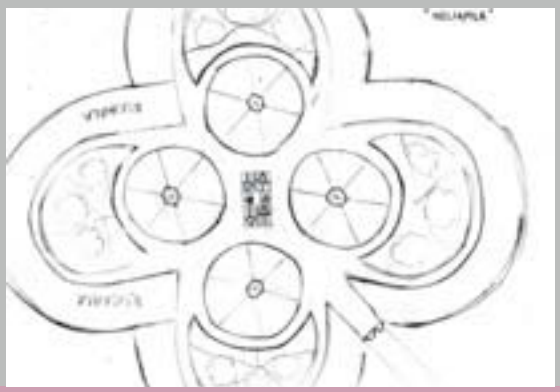
Another common composition of clusters was to locate them loosely around a yard, lobby or other common space. One common variation of this was a corridor, atrium or an agora space surrounding a courtyard, which in turn connected the courtyard and the other, separate parts of the building. Variation to this central model was a circle-shaped model, tied around the courtyard that was divided in parts with smaller circles within, plus in sectors. There was also a suggestion of a clover shaped layout formed by several smaller circular spaces.

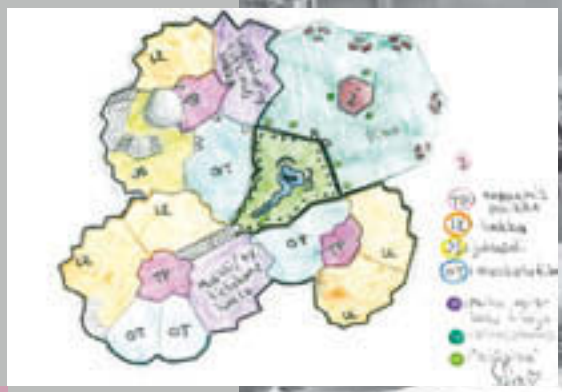
Bridges that led to either 1) from one cluster to another or 2) from a cluster to a central cluster of common spaces were frequently featured. In some cases the cells were connected via glass corridors or under the bridges. Hereby there would be several courtyards separated by these constructions. A common suggestion was a model in which the cells were like fingers pointing out of the main building, forming courtyards in between. Gardens were featured both indoors as well as on the roof - that would be staggered from ground level up as grass stairs and green roofs. Different elements of nature were combined to the spaces within the building. Courtyard and other yards were skilfully interlaced with the building. The building was often featured as having either a direct connection to water or a derived one.

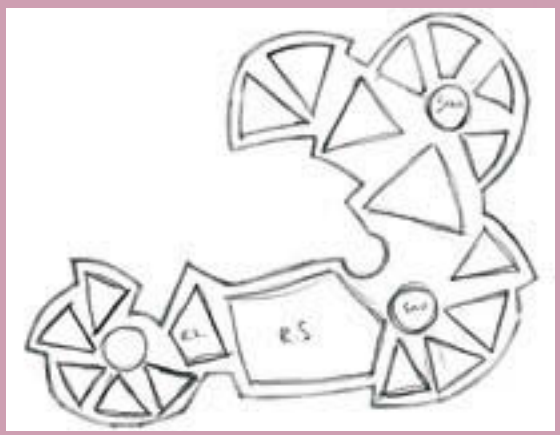
Generally speaking, the way clusters were combined and the buildings that they formed presented a great versatility and functional flexibility.

An important theme seen in the students' designs was natural light and transparency, interlacing indoor and outdoor spaces. In many designs the buildings were in several floors as well as organically and morphologically shaped both in- and outdoors. Spaces between clusters and extensions were formed to be very dynamic and varying. Both clusters and the spaces between them were in organic and interesting shapes, yet functional. Wild diagonal formation and round shapes were combined in different parts of the building and - surprisingly enough – it worked! Often, in exterior of the buildings different kinds of overhangs, small spaces and large windows were introduced. One interesting organic shape was a system resembling a honeycomb, which was easily duplicated and formed very interesting common spaces and lobbies in between.

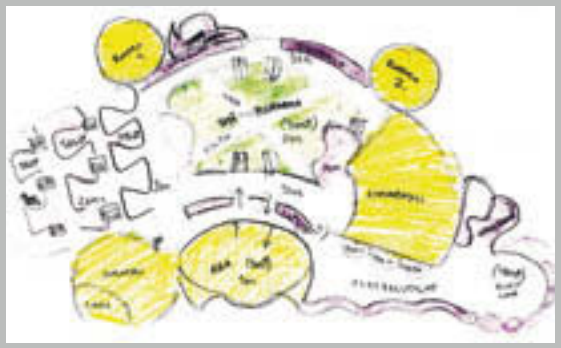
Workshop - Clusters & Patterns

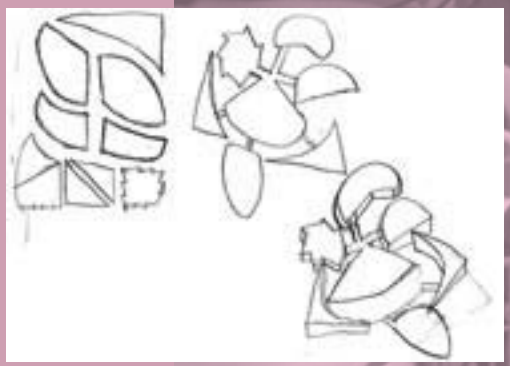




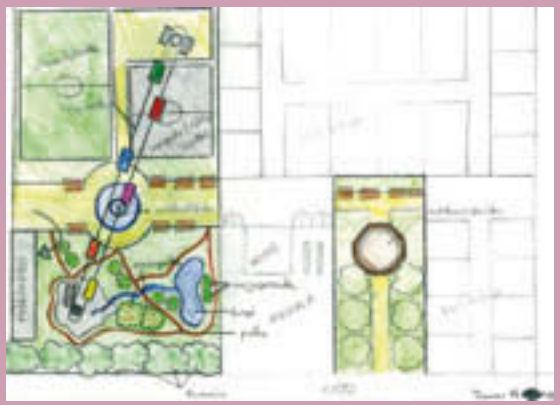


Workshop - Clusters & Patterns





8 Outdoor Spaces
& Roof Gardens



Outdoor Spaces and Roof Gardens

What are outdoor spaces like in the future school? What can be found there? What does it look like, sound like and feel like? What are the scents like, and the tastes? For who is it intended?

Thumb rules were given to assist in the drawing assignment: What are the colours, materials and shapes like in consisting spaces? What about light, shadows and rhythm?

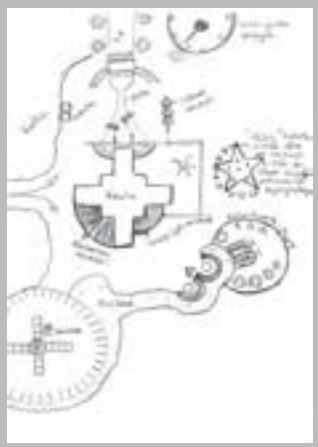
The outdoor spaces of the future school have places for different atmospheres and emotions. There are edible plants, fruits and berries, and lots of opportunities to reshape the surroundings. It is safe and healthy to be outside.

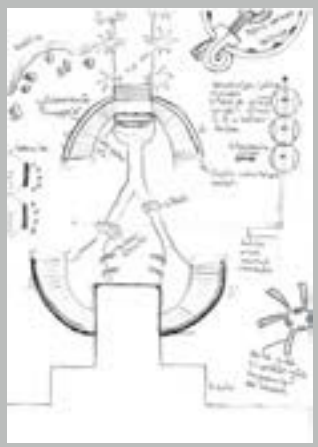
Places where to spend time outdoors are located on different levels, such as in trees, on elevated platforms or in lowered ”dents”. Ramps and stairs lead to these different levels – being places to hang out in privacy. One common proposed element was a work of art that would also act as a climbing rack, place for seating or structure for a canopy – multipurpose capabilities of the outdoor spaces were really thought of. Peaceful and comfortable places to sit and hang out were also commonly featured, ones that could also be used for studying outdoors. Also places for playing, sports, relaxing and concentrating were seen as vital. Outdoor spaces in the future school had various spaces for various uses for those big and small. There should also be more active areas for parkour or skateboarding; rails, platforms, bars and chairs. A small cafe or a kiosk was also desired. Students felt that it would be important to be able to see their own handprint in the outdoor spaces.

The school yard was divided in parts with tree-lined alleys, other plantings, water elements and with different rock and soil formations like in a Japanese garden. A bush labyrinth was suggested in several of the works. Unrefined forests and nature scenery were desired in the school’s near vicinity; this including rock walls, pools of water, areas of sand, and combinations of all of these. Rooftops of future school would have gardens, turf and different levels as an extension to the rest of the yard. In some cases the school buildings could be walked upon on its entire length: In these scenarios the school would have partially integrated in the landscape, which would serve as naturalistic extension to the building, using staggered green roofs and roof gardens. These roof yards would be connected to the interior through skylights. Courtyards could be connected to the interior by using movable glass walls.

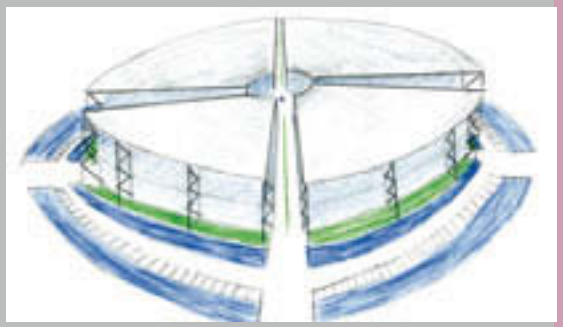
Workshop - Outdoor Spaces & Roof Gardens

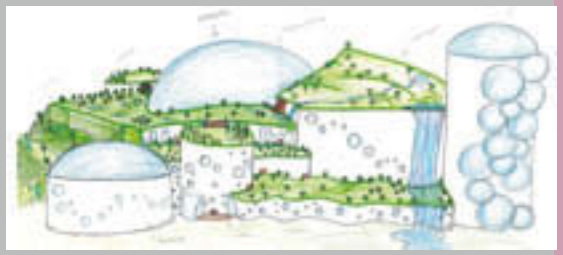
Workshop - Outdoor Spaces & Roof Gardens





9 School Appearance, Form& Layout





School Appearance, Form & Layout

What kind of components does a future school have? How do these components create the body of the school?

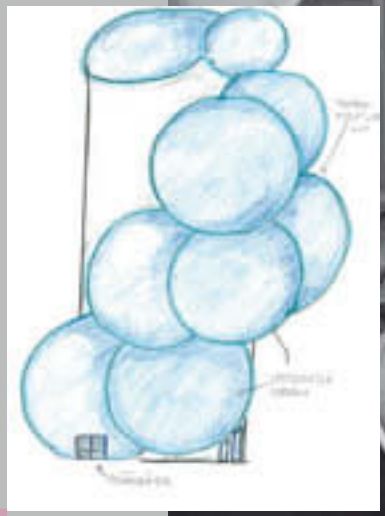
At first the groups thought of the structures that the clusters would form and what kind of masses would the different sections in the school comprise. What is the rhythm of these sections? What would the school building look like from a three dimensional viewpoint and what would take place in different floors and parts of the sections (and under/above/inside/outside). The students contemplated what the school building would look like as it would be consisted of clusters, what shapes would it take, how would it be massed and what would the roof be like; also colours, materials and other atmosphere affecting elements were given consideration. In the beginning there was also thought given to the rhythm of school spaces and sections. What is the message of the school to its users? And in the end, what really makes building a school? The assignment was now to draw layout plans, floor plans and perspective imagery, combine these with the design of exterior areas and make scale models of these.

In many of the works, elements of the nature such as water and vegetation, were connected to the building itself; there were vines, grass roofs and roof gardens. Design of the building often originated from the nature. There were fans, amfis and organic shapes. Also the canopies that linked school building to the surrounding landscape were inspired by the nature. Composition of the facades, as well as windows, was organic, in both design and rhythm. Skylights in different levels, different light catchers and overhung windows on roofs and walls were also interesting. In majority of the works windows were given a lot of surface area. Options for expansion were also well considered. Formations with multiple sections gave the freedom to add more cluster buildings if necessary. Multiple-part buildings that were divided into clusters created an interesting rhythm formed by school masses and the courtyards in between.

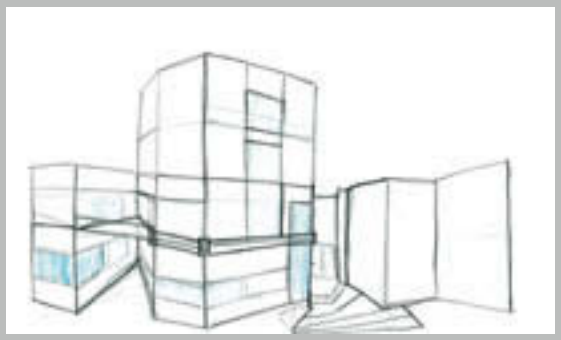
Architectural massing of school buildings was free formed and the compositions were organic and diverse. In many of the works the rhythm of wall shapes resembled the works of the Finnish pioneers of organic architecture, the Pietiläs. Sloped and angular shapes in walls and roofs brought dynamics to building plans. Sculptural, organic and morphological shapes were prominent in the buildings. Design bared a resemblance to rocks and blocks of ice in the way glass was used. Honeycomb models became intriguing, diverse and modern when observed in 3D. In some of the works parts of the school stood on pillars, connected to each other by bridges.

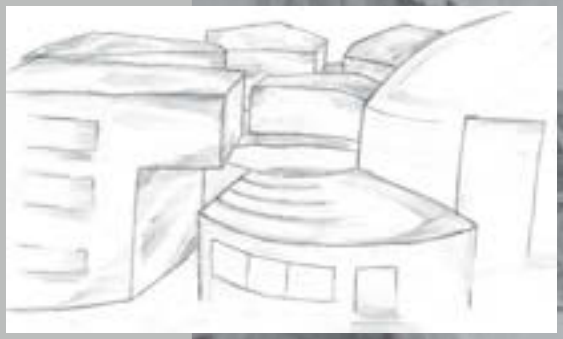
The central main building with smaller clusters connected to it, clusters circling the courtyard (in a manner of a stoa or an agora) and the clusters on the sides of piazza were the most commonly used basic designs, considering those with the basic idea of separating the building into smaller sections. In addition to these there was one design that clearly stood out: Finger-like wings pointing out of the main building forming a series of courtyards in between. In the fifth outstanding model the school building was integrated to the surrounding landscape by terracing the ground level into the roof, creating yards and gardens on the rooftop as the wings created courtyards in between.

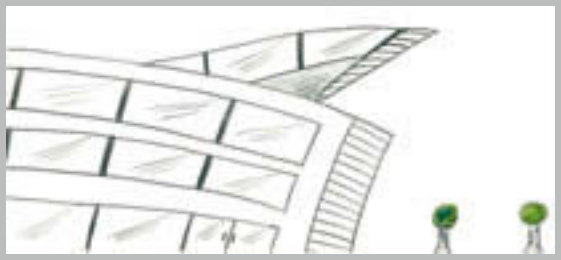
Workshop - School Appearance, Form and Layout

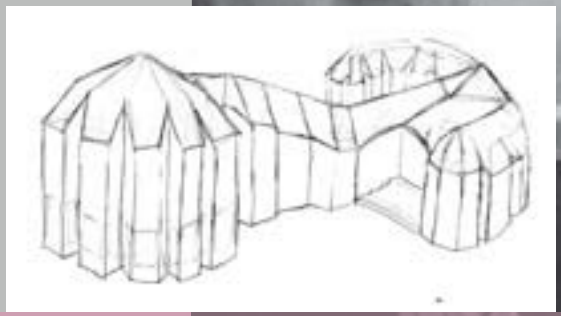


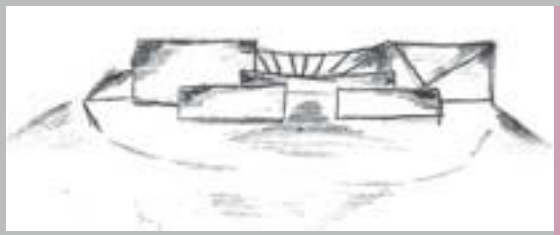
Workshop - School Appearance, Form and Layout

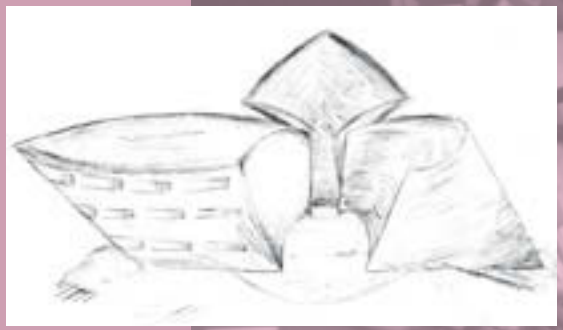


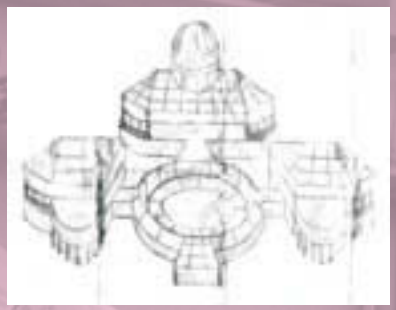


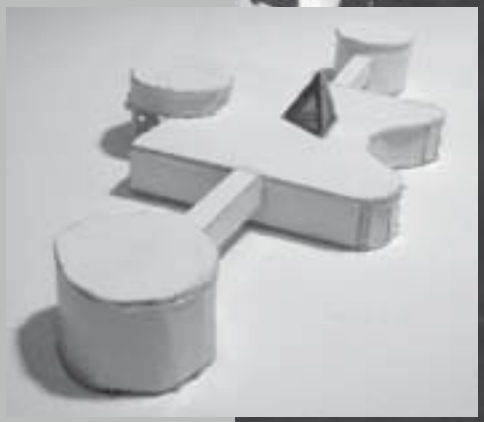


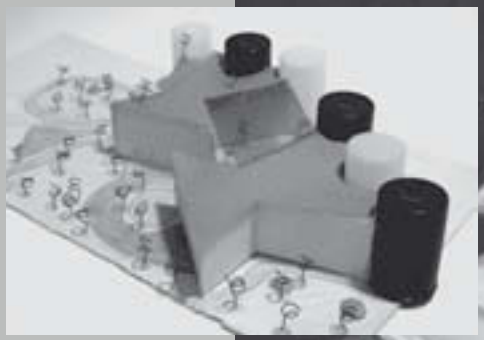


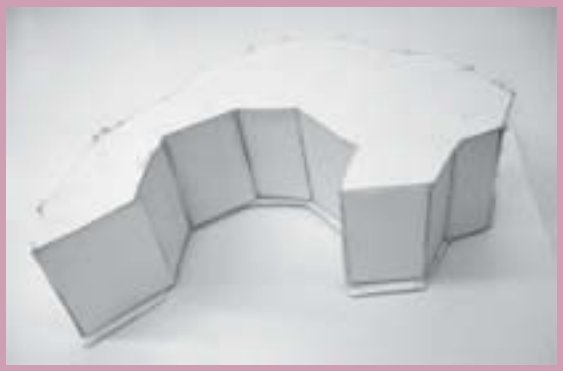


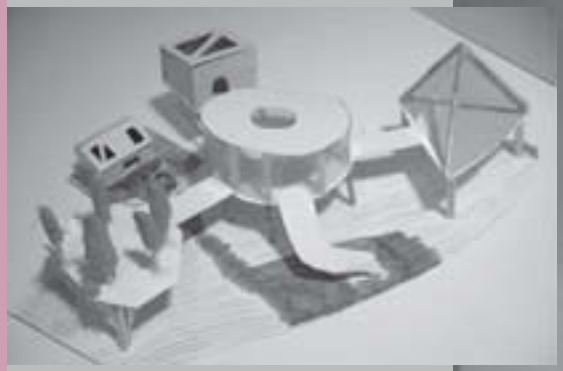












The Themes Arise

The workshops and their results were thoroughly documented. When research on the results begun, some themes started occurring repeatedly. Many of these themes appeared to be in line with the contemporary research and literature on the subject made in other countries.

In the extensive school reform of Great Britain ”Building Schools For the Future” the status of the school as a center for the entire community was emphasized, as well as the fact that schools should be designed considering the needs of all the user groups. In the workshops of Arkki the school best adapted to users’ needs by giving the student adequate space for both learning and gatherings. The role as a community center could be enhanced by providing a varied range of services and culture to the community. Examples of this are spas, spaces for performing arts, sports facilities and mediateques. Flexibility, adaptability and linear space series as well as inspiration and innovation stood out. Courtyards and varied outdoor spaces were also seen as learning spaces. Schools should be both comfortable and foster their users’ well-being; in the children’s’ workshops this was done with comfortable furniture, colours, art and plentiful natural light. Sustainable development was a self evident and framed theme in the British reform – Arkki’s children’s workshops emphasized sustainability with locally produced materials and green roofs.

The vast literature of OECD concerning school buildings emphasizes the challenges the ever changing world creates, as well as taking new technology in account. To design school buildings both sustainable and pleasant is naturally everyone’s goal. The presented goals in interaction and participation are very much in line with the InnoArch research program, and student workshops really implemented participative design, this time from point of view of the school´s largest user group, the students. OECD thinks that the school building should serve as a tool for learning. In our workshops the children suggested maps as wall surfaces, ceilings with sky patterns, greenhouses, laboratories and other novel learning spaces. According to the socio-cultural framework of our transdisciplinary research (Vygotsky 1962, 1978, Säljö 2007) a person needs tools for learning; so here we contemplate whether a school building could be one – a tool for learning.

Microsoft (USA) has launched their 6i-model for school planning. 6i stands for: Introspection-Investigation-Inclusion-Innovation-Implementation-Introspection. Microsoft also emphasizes the school's need to be both community focused and cooperative towards the surrounding neighbourhood. School should also be flexible: both the staff and the students should interact with the community. School's relationship with the environment is also emphasized as a way of learning about ecology and because of the both calming and stimulating effects the nature has on people. School should be seen as motivating and maximizing the amount of natural light is a key issue. All this matches with the Finnish way of thinking as well as the preferences the children at Arkki have. Emphasis on research, laboratories and experimental learning spaces are good examples of focusing on activities.

In its 2007 proclamation American Architectural Foundation set itself goals to support varied ways of teaching and learning with design, as well as those of introducing new alternatives to learning spaces – once again in line with our InnoArch research program: Laboratories, varied experimental learning spaces, spaces and technology supporting independent study and mediatheques stood up as facilities for new ways of learning in the children's workshops. In the children's work, fading the boundaries of classrooms, common spaces supporting independent study, learning spaces outdoors as well as ability to combine learning spaces both in- and outdoors offered a lot of alternatives and flexibility. It was also pointed out that technology integrated in the building could improve learning.

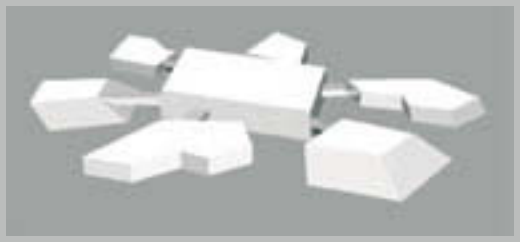
School must be built sustainable, it should be durable, clean and green and naturally also safe, healthy and pleasant. School should operate as a community centre in the same manner as built around USA "one room school houses" once did. School's design and activities should be based on community participation.

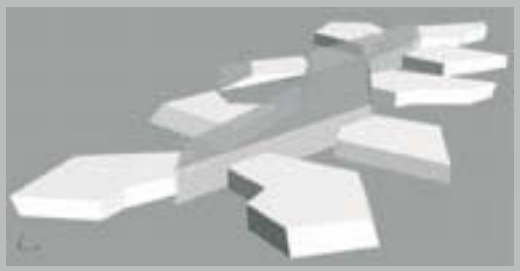
Thus there were a lot of similarities to be found when comparing Finnish research and international literature and researches on the subject. We would like to crystallize our key findings from the Arkki children's workshops around few key themes that will be used as the building blocks in the typologies of the next chapter:

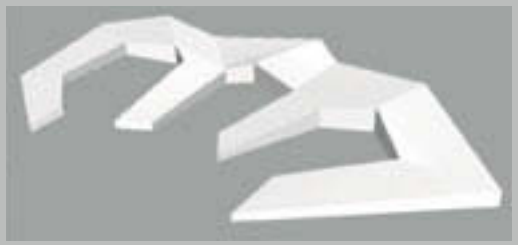
- **Amount of light**
- **Spacious and operable/flexible spaces**
- **Nature around and inside the building**
- **Child´s own space**
- **Meeting places**
- **Smaller entities inside bigger ones**
- **Varying outdoor spaces**

Part 2

Typologies for the Future School







Typology stands for a classification system according which phenomena in a certain branch of science is sorted on the basis of attributes. It also stands for defining classes with typical events, perfect events or type models. Typology can be defined on the basis of research findings, selected from material, or constructed as a combination of typical attributes from the material.

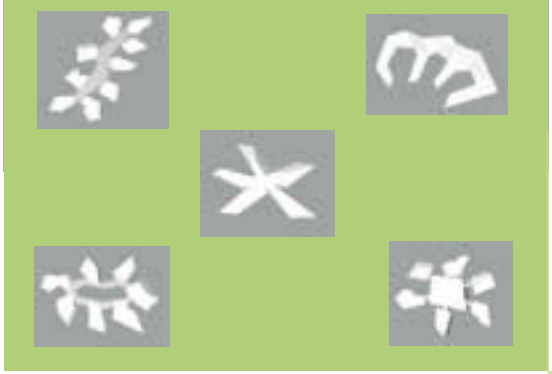
The children's workshops organised in fall 2007 and their results were closely documented. The results were then studied by InnoArch's researchers; architects and students of architecture. They were also presented in the joint seminars of transdisciplinary InnoSchool consortium and in the workshops organised to the partner network in spring 2008.

Student of architecture Sini Meskanen developed the results of children's architectural workshops into typologies, future school types, reflecting the results to international school research and design. These typologies are accordingly models of school buildings that integrate results form the children's workshops and the arising phenomena, trends and themes from the future school research of early 21st Century. School typologies are three-dimensional models that have developed from the aforementioned themes and their combinations in a way that best crystallizes them as viable building types.

Themes of which the typologies are comprised of stood up, as described, from all the future school research and also from the children's workshops. Therefore it can be said that they realize both the designers' and the users' demands and wishes for the schools that will be built from this day on. These themes can be seen as universal, since the analysed research was gathered from around the world as well as done here in Finland. Our research program has noticed that these themes and their variations have been issued in several recent architectural competitions on schools in Finland. In this book we will present

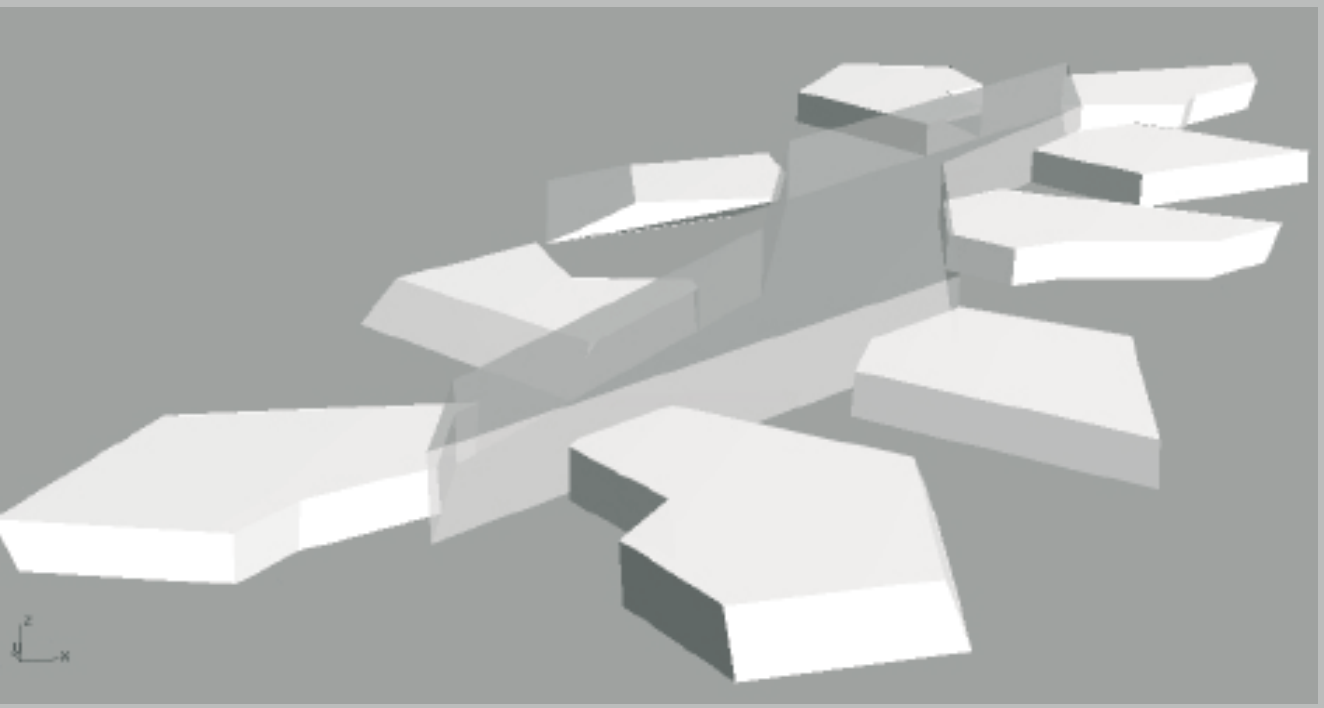
Five typologies:

1. Piazza
2. Roof garden
3. Stoa
4. Series of Atriums
5. Heart, bridge and clusters



1st Typology

Piazza



Piazza refers to a paved open pedestrian space, without grass or planting, often in front of a significant building. It is an open area commonly found in the heart of a traditional town used for community gatherings. Piazzas are suitable for open markets, music concerts, political rallies and other events that require firm ground. Being centrally located, piazzas are usually surrounded by small shops such as bakeries, meat markets, cheese stores, and clothing stores. At their center is often a fountain, well, monument, or statue. In urban planning, a city square or urban square is a planned open area in a city, usually or originally rectangular in shape. The first urban formations started appearing at least 6000 years ago. Within urban areas open public space always existed and it served a very important purpose. Along with the development of human society and the development of cities, the squares acquired more and more functions. At first, the squares were established at the crossroads of important trade routes where exchange of goods as well as ideas took place.

This is how Piazza was discovered from the results of children's architectural workshops:

The most crucial element found here is an urban-like square, piazza, inside the building, which is meandering, varying in intensity and resembles an avenue or a marketplace. Piazza is the heart and spine of the school and a pivotal place for meetings and events. The central space appears spacious. It is often several stories high and opens up into a spacious lobby in many points, like an open heart that gives people space to breath. In a series of high spaces, space flows also vertically: learning spaces open up straight to the piazza downstairs and on the floors above to the balconies which open up to the piazza.

Height and spaciousness of Piazza are also emphasized by plentiful natural light from the skylights. Light is an important comfortability factor at meandering avenue space of the piazza. Piazza-typology also includes the clusters: The school's building mass is divided in sections and the feeling of "own space" expands to include the entire cluster building and all of it is conceived as own and personal. Architectural masses are of a small scale and therefore fit the perspective of children better.

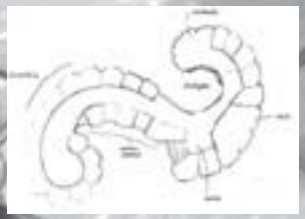
Nature is present inside the building and there is a connection to the nature from the piazza. Piazza often has a lot of exits or unfolding walls and nature elements: these will activate smell and hearing in addition to vision. Linkage between in- and outdoor spaces is characteristic. As there are unfolding glass walls and plenty of terraces in front of them, the exterior and interior interlace therefore opening the piazza and connecting it to the outdoors.

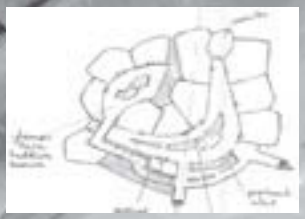
Piazza as a center point of a school is nowadays presented, for example, in the school model by Reggio Emilia pedagogics. Piazza means a central space in the school into which the most important spaces open up. Piazza as a meeting place supports forming relationships and public identity. In addition to this piazza symbolises the pedagogy of interpersonal relationships by encouraging meetings, interactions between groups and social relations. On the other hand the piazza model of Reggio Emilia makes corridors useless and thus transitional spaces, which do not support activities of children, can be totally avoided. (Ceppini & Zini, 1998)

Christopher Alexander writes about a space in the middle of the building that simulates

1st Typology - Piazza

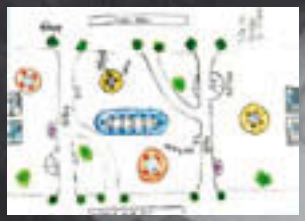
Layouts

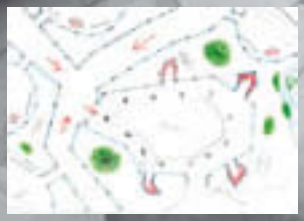




Interiors

Layouts &
Interiors





Architectural
Masses

urban space (A Pattern Language, 1977). This kind of variable sized urban space inside a building is the backbone of people flow ad has different meeting places and activities, exactly as is described in the Piazza-typology. Common spaces such as school cafeteria, library, stage with auditorium and display spaces for art and school projects can be located in the piazza. Alexander considers it important to have outside views and connections to outdoors. In the Piazza-typology this is achieved by glass walls.

Birgit Cold has created four metaphors about school buildings: urban space or village; greenhouse; bazaar street and art exhibition (Cold, 2002). Piazza -typology resembles most the urban space that, according to Cold, should have social meeting places for various groups, both inside and out. In a way the Piazza-typology resembles also the bazaar-metaphor where school is seen as a bazaar street where services, projects and works are visible to by passers.

Cluster buildings enter to the piazza with entrances opening there. Due to these inwards into the Piazza driven building masses the private and public space interlace with each other and their boundaries fade. All the cluster buildings have entrances from outdoors. They enhance the school's connection to the environment. Arkki workshops frequently suggested that there should be entire unfolding walls in the clusters; completely interlacing interior with the outdoors.

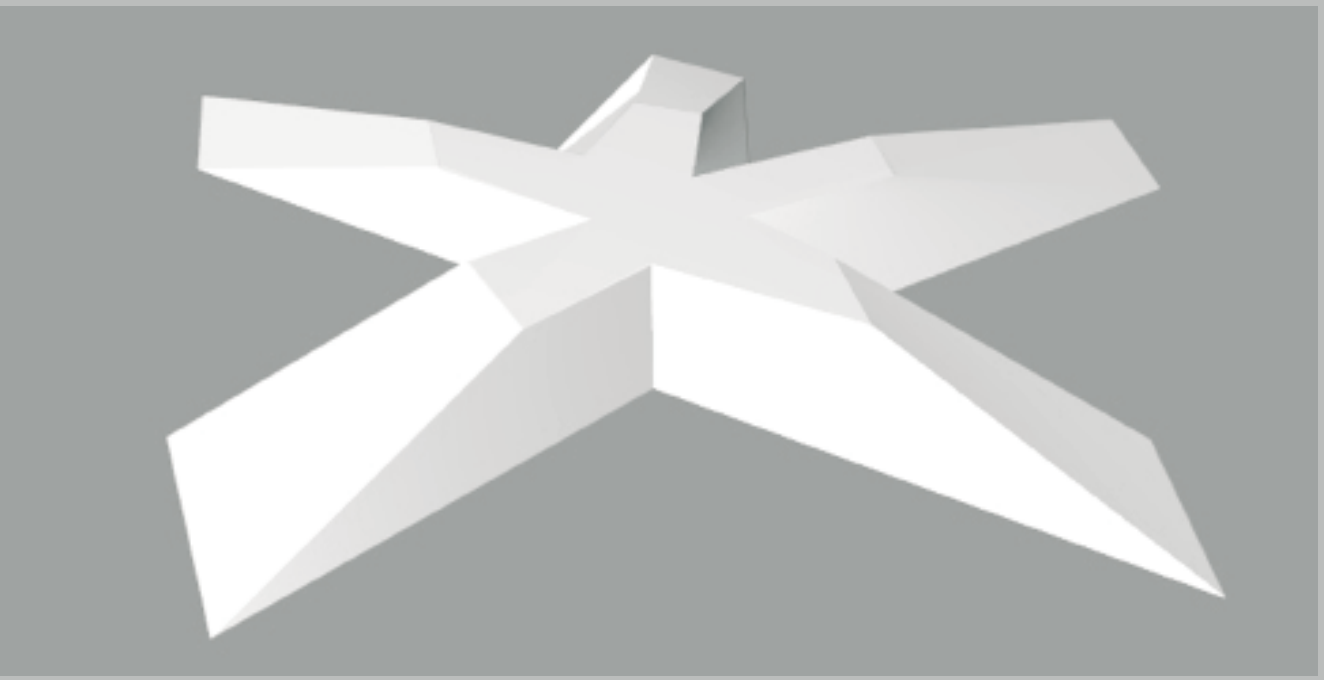
Christopher Alexander also wrote about the importance of the ability to split the building in smaller sections (Alexander, 1977). Also connections to outdoors were emphasized in Alexander's thinking. Series of exits, separate entrances to separate sections of the building and utilizing the outdoors are all key elements and building blocks in the Piazza-typology. Cluster buildings can operate as an own space for a certain age group or for a certain subject. When the cluster spaces are divided by the age group the entire cluster building becomes the user's – the child's own space. Most of the teaching takes place in an assigned learning cluster and the social groups remain strong. This model also prevents large people flow in the common spaces, thus decreasing crowding.

On the other hand if the cluster spaces are divided by subject groups, formation of mutually beneficial subject groups takes place, thus enabling Reggio Emilia's idea as well as inquiry-based learning, project-based and experimental learning where larger entities and combinations of subjects are in focus. This enables the formation of, for example, a science cluster, design cluster, language cluster and a technology cluster.

Piazza-typology repeats certain themes that are actual today and actualize the school design trends of the 21st Century. These themes were first presented in the experimental school buildings of the 1930's. For example, in the Experimental School of Richard J. Neutra from the year 1934 there is interlacing of indoors with the outdoors by using entirely unfolding walls. Same themes; light and interlacing indoors with the outdoors and outdoor learning spaces can be found in the Institute Héliotherapeutique by G. L. Banf & associates from 1938. 'Ecole en plein air' by E. Beaudouin and M. Lods from the year 1935 in Suresnes bears resemblance to the Piazza-typology also by its structures. It has a long building mass with common spaces and a serie of clusters where the learning and teaching takes place. (Frampton, 1980)

2nd Typology

Roof Garden



History of roof gardens stems from the antique. Roof yards and gardens have had many purposes over the course of history. They have decorated the buildings, they have been used for farming and they have helped in regulating temperatures.

Roof gardens have emphasized architecture and they have played a pivotal role as recreational areas, especially in larger cities. For example, in Manhattan there are very little green areas, thus emphasizing the role of roof gardens. One famous example of a building with a roof garden is the Chicago City Hall.

This is how Roof Garden -typology was discovered in the Arkki workshops:

Roof gardens utilize the space that is usually without good use. The roof is versatile: roof garden and place to hang out create a more interesting school building. Utilizing the roof gives new perspective to the surrounding environment. In some of the works the land is built in terraces: when land gradually transferred to roof, the boundaries between land, walls and roof fade.

Green roofs are ecological and they display the use of locally produced materials. Natural light is also important to this typology: lot of natural light gets inside through large windows and glass walls in between terraced roofs. Also in this typology the masses divided in sections and own space is created by wings – also clusters in a way. ”Own space” is an important element in the future school.

Roof Garden -typology creates interesting indoor spaces that vary in height as the roof inclines or declines due to terraced shapes.

Roof Garden -typology pinpoints the importance of roofs as a recreational area and yard. Land continues as a green yard terracing from ground level over the school building from several directions; thus fading the boundaries of land, wall and roof. In many of the designs at Arkki the roof was also utilized as a learning space – both by placing learning spaces on the roof and by connecting learning spaces indoors directly to the roof area.

In his book ‘A Pattern Language’ Alexander presents that it is pivotal for a building to have a series of roofs; a series of usable outdoor spaces as well as roof gardens. Different overhangs and terraces, as the overhangs in Roof Garden -typology, enrich the building’s design language. Alexander’s considers it important to have good views and connections to outdoors. The wings and the terraced roofs in Roof Garden -typology have glass walls and thus offer good views and light and also – if unfolding – exits straight to the roof. Entrances are in between the wings which is in line with Alexander’s views on series of entrances. (Alexander, 1977)

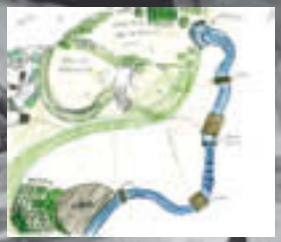
The building is entered from between the wings in Roof Garden -typology. Every wing has its own entrance. Like in Alexander’s patterns, the building is divided in several sections in this typology also. The goal is that all the sections could have an identity of their own, just as Alexander proposed in his book. The wings form similar groups of learning spaces as the clusters in Piazza-typology and they can be divided according to age groups or subject groups – just as clusters.

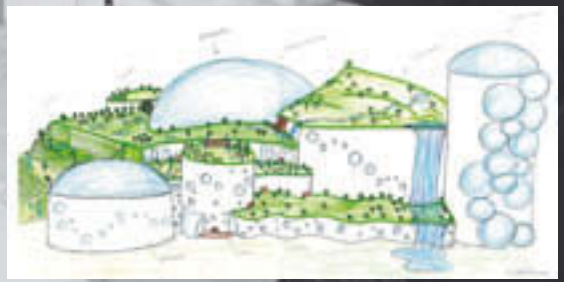
2nd Typology - Roof Garden

Architectural Masses

View, Layout, Section

Architectural Mass





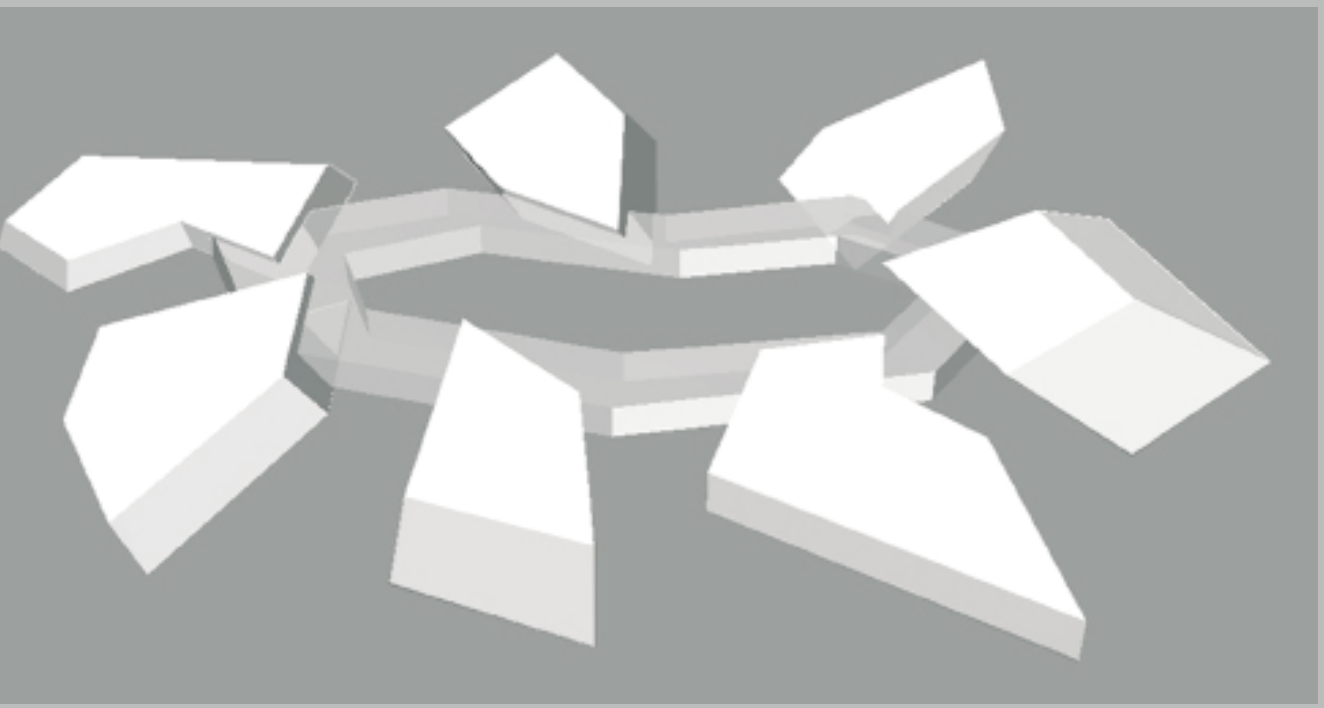
Glass walls make the wings full of light with good views outdoors. The spaces also vary in intensity as the ceiling height changes. There is a central plaza in the middle of the building that functions as the pivotal place for gatherings and events. Common spaces and halls are also located in the tall central space. (Alexander, 1977)

Roof Garden -typology also realizes the Birgit Cold´s metaphor of ”School as a Greenhouse”. Life of nature, colours, the cycle of life and ecology stimulate thinking and action and add to wellbeing. Nature is interlaced with the school premises in many ways, both in outdoors learning spaces between the wings and in the green rooftops. (Cold, 2002)

Many of the Roof Garden typology’s 21st Century themes have been introduced in experimental schools as early as in the 1930’s. Institute Héliotherapeutique by G.L.Banf and associates utilizes rooftops as gardens. It has roofs on many levels thus comprising an intriguing roof world. The Experimental School by Richard J. Neutra has an outdoors learning space connected to each classroom, just as our Roof Garden typology suggests. (Frampton, 1980)

3rd Typology

Stoa



This is how we found Stoa-typology in the workshops:

In the centre of the school there is a courtyard with a glass corridor surrounding it – from which you can see out without being outdoors. Glass walls open up the views and bring in natural light: Stoa bathes in natural light, which makes it a pleasant meeting place to hang out and spend time. Connection to the nature is strong: In Stoa you can feel the nature though being inside, maybe even warm and dry, safe. Multiple exits and unfolding walls enable an easy connection to the outdoors. As the Stoas glass walls are opened, indoors and outdoors are interlaced with each other, combined, allowing space to flow. The Stoa masses are of a small scale and the own space expands bit by bit in the cluster building and the entire building is conceived as own space. Courtyard is literally a sheltered outdoor space that surrounds an open outdoor space. Boundary between indoors and outdoors fades away.

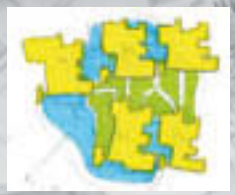
Stoa was originally a place for meetings and events, and the modern Stoa-typology has the same kind of functional features. Gatherings take place at the Stoa and one could arrange art exhibitions, teach and have meetings there too. Stoa circles the school courtyard. Because Stoa has glass walls the space circling the yard is connected to it and in a way continues inside the building. Cluster buildings partly enter into the Stoa with entrances to it. Thanks to these inwards pushed building masses the public and more private space interlace and their boundaries fade.

In the Arkki workshops all the cluster buildings had their own individual entrances, thus enhancing the school's connection with its environment. Connections to outdoors were also emphasized in Alexander's book, as were the series of entrances and independent, corridor-linked separate buildings. All this can be found in our Stoa-typology and they are its basic building blocks. It almost feels like Alexander would have referred directly to the Stoa-typology´s model.

The cluster buildings can serve as an own space to a certain age group or a subject group also in the Stoa-typology. When the spaces of the clusters are divided according to age groups, the entire cluster building becomes personal for the user, the student. Own space was one of the emerged key themes in the Arkki workshops. In this model most of the teaching takes place in an assigned learning cluster, and social groups and the sense of belonging were strong. This model also takes off pressure on the people flow in the common spaces, thus crowding is less of a problem. If the cluster spaces are alternatively divided by subject groups there will be mutually beneficial subject clusters, thus enabling inquiry-based learning, project-style and experimental learning where larger entities and combinations of subjects are in focus.

Courtyard in the middle of the building is a sheltered and peaceful own space in the Stoa-typology; one where you can hang out outdoors safe as if the building was protecting and clasping you. There is a good visibility from Stoa to the courtyard through glass walls and by opening them one can combine the courtyard and the Stoa as one single space. Courtyard is the heart of the school and a central meeting place. The courtyard

3rd Typology - Stoa



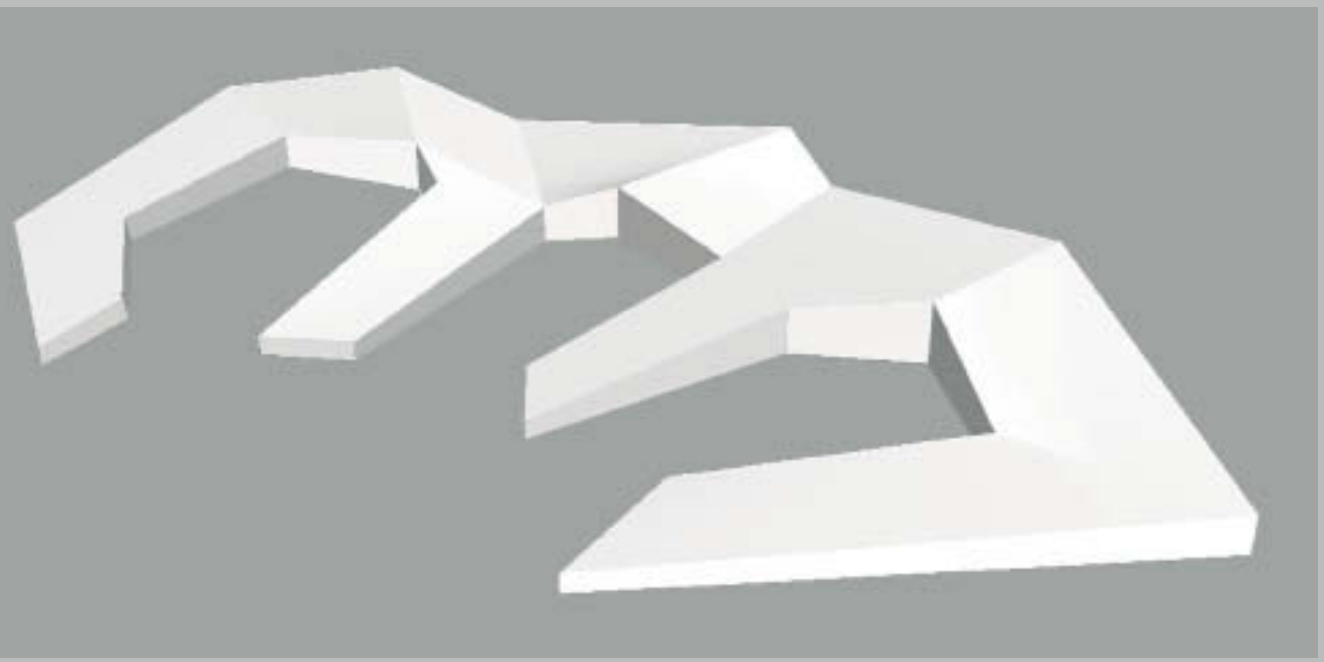
can be partly covered with glass roof if climate conditions so require, as they do for example in Finland, thus still allowing natural light in.

Stoa-typology realizes the themes of Greenhouse and Bazaar Street of Birgit Cold´s school metaphors. As in the Greenhouse-metaphor the life and cycle of nature, colours and ecology stimulate thinking, action and enhance wellbeing, so does the Stoa allow the school to interlace with the nature in many ways. There are outdoor learning spaces between clusters and when connected to the courtyard Stoa creates a safe outdoor space where one has good views to the surrounding nature.

The 21st Century themes of the Stoa-typology can also be found in experimental schools built in the 1930's. Both G. L. Banf and Richard J. Neutre featured outdoor learning spaces next to the classroom, as is also done in the Stoa-typology in between the clusters. 'Ecole en plein air' by E. Beaudouin and M. Lods is based on utilizing the outdoors and also on cluster model, just as Stoa-typology. (Frampton, 1980)

4th Typology

Series of Atriums



This is how ”Series of Atriums” was discovered in the workshops:

A courtyard that is actually outdoors and at the same time a sheltered own space is characteristic. Outdoors are brought inside the building and there is literally a covered outdoor space inside the school. The school indoor spaces have views to the courtyard and access to outdoor learning spaces. Indoors and outdoors are interlaced. The unfolding glass walls of the courtyard allow space to flow. Connection to the nature is strong: you can feel it standing in the courtyard without being outside the school. The organic design of many of the works stems from nature and therefore connects the school to the surrounding environment. Walls can resemble boulders or crystals. Courtyard with glass walls bathes in natural light which makes the spaces surrounding it very pleasant meeting places - ones that are ideal for spending time.

In the Series of Atriums -typology the open or sheltered courtyards lined with organic shapes have an important calming purpose. Each wing that expands away from the main building mass comes with an individual outdoor space that is not necessarily closed on all sides. Courtyards together with the wings create a varying series of indoor and outdoor spaces. Indoors and outdoors are strongly interlaced in this typology, since the walls of the wings surrounding the courtyards are made of glass and unfold, if needed, to combine outdoors with the indoors. All the courtyards have entrances to the main building mass (in addition to the wings) which open up to a Piazza-type space with common spaces and halls being lined up on the sides. This common space and meeting place forms the backbone of the school building in which all the events take place. Common spaces in the main building create – just as Alexander emphasized – the heart and soul of the building complex (Alexander, 1977).

In the Series of Atriums -typology the intensity of learning wings differs from that of the common spaces, because their ceiling declines from the tall common space clusters in the common areas to the lower spaces in the learning areas. The building is entered from between the wings in the Series of Atriums -typology. Each wing has an entrance on its own, which in turn creates the series of entrances highlighted also by Alexander.

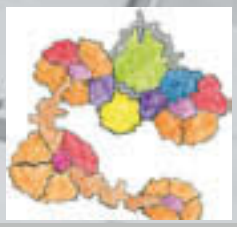
As in Alexander’s patterns, in this typology the building is split into several sections, therefore forming a building complex of a small scale in which each section has its own identity. Wings form similar groups of learning spaces as the clusters in Piazza-typology and they can be divided into age groups or subject groups in the same manner as the clusters. In this typology, the series of courtyards in the middle of the school creates a series of sheltered and peaceful own spaces, where one can feel safe and protected outdoors – as if the building itself was clasping you. The wings have good visibility to the courtyards through glass walls and one can combine these into one space by unfolding the walls.

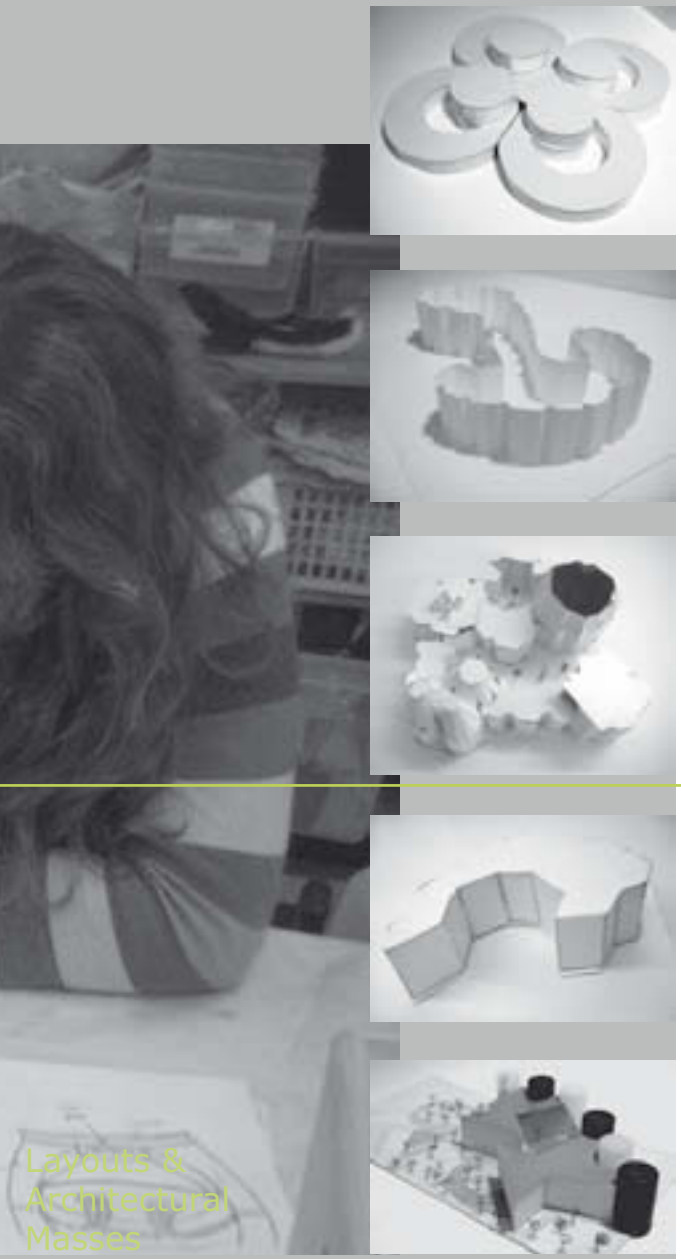
Series of Atriums creates a heart of the school and a central meeting place. Courtyards serve as outdoor learning spaces and each of the wings has one. Building’s connection to the nature and natural light are emphasized by the courtyards, which were central themes in Arkki workshops.

4th Typology - Series of Atriums

Views

Layouts



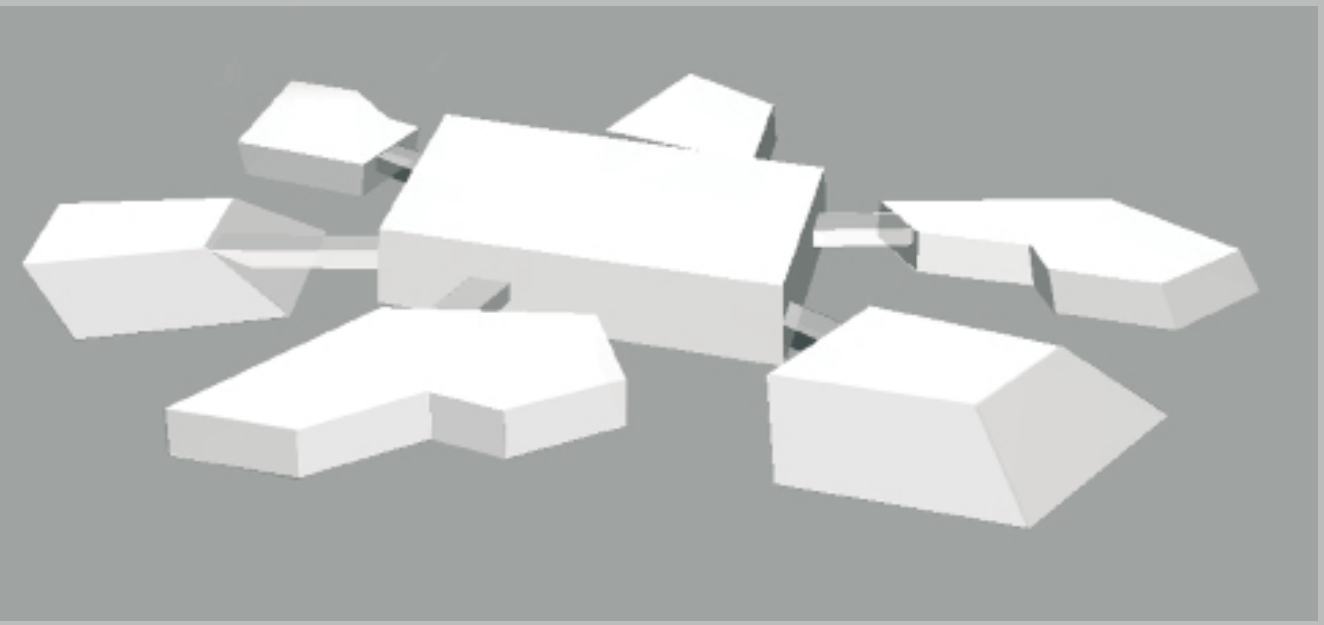


There can be found similarities between Series of Atriums -typology and several school metaphors by Birgit Cold (Cold, 2002). For example, both in the Greenhouse-metaphor and in Series of Atriums –typology, nature, life, colours and ecology stimulate the mind and body and support wellbeing. Series of Atriums -typology also realizes Cold's Urban Space-metaphor with meeting places both inside and outside. Displayed projects, works, services and events in the Bazaar Street -metaphor can also be found in the Series of Atriums.

Combining the indoors with the outdoors, courtyards and outdoor learning spaces were also present in the experimental schools of the 1930's mentioned earlier: Ecole en Plein Air by Beaudouin and Lods, Institute Héliotherapeutique by Banf and Experimental School by Neutra. (Frampton, 1980)

5th Typology

Heart, Bridge & Clusters



This is how "Heart, Bridge and Clusters" typology emerged in the workshops:

Some of the models emphasize especially the clusters and the division of building mass into small scale sections, in the way that space expands in cluster buildings and finally the entire building is perceived as one single space. The entity has a clearly separate main building (Heart) into which clusters are attached via bridges and where all the most common spaces are located; larger halls, the school cafeteria as well as the meeting and gathering places for the entire school.

Bridges function as a beautiful entrance to the smaller parts of the school, the clusters. In some of the models a glass walled bridge opens up views to the outdoors and is very bright. The bridge also functions as a "bridge of learning". The glass walled main buildings (Heart) spaces bathe in sunlight which makes them pleasant meeting places. The arrival to the clusters also comes via the bridges, making the arrival especially pleasant and bright. Inside the clusters one can feel the connection to the surroundings, while still indoors. Numerous individual exits and unfolding glass walls enable an easy access from the main building and the clusters to outdoors and to the outdoor learning spaces.

Christopher Alexander emphasizes the meaning of the main building as the heart of the complex and as the centre of social activities (Alexander, 1977). In his book he points out the importance of dividing the building into sections and the interesting qualities of a building complex that is divided in several parts. On the other hand Alexander also emphasizes the small scale and the arcades, bridges and walls that connect the different buildings. Heart, Bridge and Clusters -typology is a combination of all these qualities and models.

The clusters are linked via bridges to the main building, where the school's most common spaces are situated; larger halls, school cafeteria, library and the meeting and gathering places for the entire school. Main building is the central meeting place for the whole school and a stage for events. Its central spaces are tall and spacious. The central spaces of the main building can also be compared to the marketplace in urban environment, or the heart of an institution and the soul of a building complex. Space flows also vertically and in the middle of the building the space is several stories high. The main building stands out in both identity and intensity when compared to the smaller scale cluster buildings.

The clusters define small outdoor spaces in between that function as clusters' own courtyards. This way each cluster has its own outdoor space into which it is possible to combine the indoor spaces with unfolding walls. Interlacing and combining outdoors with the indoors as well as connection to the nature and outdoor learning spaces stand out in this school typology.

Light stands out as a strong theme in the same researches and workshops and plays a major part in this typology. Glass walled main building's spaces dwell in natural light which makes them particularly pleasant meeting places. Also arriving to the clusters takes place via the glass bridges and is very

5th Typology - Heart, Bridge & Clusters

Layouts

Views &
Interiors

nice and bright experience. These same occurring themes; combining outdoors with the indoors, light, using outdoor spaces as learning spaces as well as the cluster model can all be found in the previously mentioned experimental school buildings from the 1930's (Frampton, 1980). This typology also has its similarities with Cold's school metaphors, namely Greenhouse and Urban space (Cold, 2002).

Conclusions

In his book 'A Pattern Language', written over 30 years ago, Christopher Alexander approached the subject of architecture from a perspective never seen before. In his book he tried to understand the human psyche and its connection to built environment and architecture. From this perspective he discovered many sides of architecture that either worsened or enhanced the overall atmosphere of a building. By using this information he was able to produce many spatial models (patterns) that fulfilled their users' needs and supported their community and action (Alexander, 1977). This very same perspective has been used in this research to find out what kind of a school building would serve its users (in this book especially the children and students), their communities and actions in best way possible in the future. Basis is drawn at the same time from the universal demands of professionals and from the future trends of 21st Century.

In his book 'A Pattern Language' Christopher Alexander wrote that a recurring pattern portrays a problem that is repeated over and over again in our surroundings. After that he describes the core of the solution, a pattern, in a way that the solution can be used millions of times, each time in a different way. (Alexander, 1977)

In this work the new school typologies that can be considered either as patterns (as Alexander did) or as a combination of patterns, bring a breath of fresh air and a 21st Century perspective to school design.

Themes that are the basis for typologies are also patterns in their own way. Every school typology presented here is therefore a unique comprised combination of trends and themes from the modern research – five typological entities of modern trends and themes.

These typological models, school typologies, answer to most of the challenges most new trends and teaching/ studying/ learning styles present, offering them a fitting and flexible environment. The learning environments that these five typologies present answer to new challenges and also support creativity, inspiration and innovation.

The combined themes of these five typologies emerged from the children's architectural workshops (as well as from the international school research), one by one. In the research made in Arkki with children and teens, a student´s "own space" was especially emphasized. The concept of own space expanded from a single classroom to entire building masses, clusters, that finally became a central theme. This theme can be found in three of the five typologies.

A theme that was strongly present at Arkki as well as around the world was the connection to the nature and utilizing the outdoor spaces in learning. All five school typologies supported this theme with their own yards for clusters and wings, with the unfolding walls and with individual exits to the outside learning spaces.

Alexander's theories were not appreciated to their true value at the time of their release. Their value has grown to their rightful appreciation only in recent times. This appreciation can be seen as a strong emphasis on participative design and listening to the users. In InnoSchool -research program this is one of the fundamental themes. Alexander's patterns and his ideology still work; they are both needed and current three decades after their release. Today we finally understand that the patterns in our built environment influence our brains and our psyche. (Alexander, 1977)

Alexander's patterns are rather general but he also does go to details in his book. The influence of his patterns and ideology can be seen in today´s society and built environment. However, in school design these patterns can be seen at a much slower phase. Alexander's patterns are more equal to themes from modern day research than with the solutions done so far. (Alexander, 1977)

Partly the reason for slower regeneration in school architecture can be the fact that for a long time, the architects, teachers (and other user groups) and researchers of learning have missed a shared understanding and shared language. The most recent research on learning still has not been implemented in school design. The transdisciplinary InnoSchool -research program (that included architecture, urban planning, teacher education, business and network research) tries to do its share in bringing a shared language to the field of school design. Users; children, teens and adults, can have their word in this research.

Students' opinions, needs and innovative ideas have so far been largely neglected. School design should put more emphasis on the ideas and needs of students, the schools' largest user group. This way we can find not only functional and comfortable learning environments for students and other user groups, but also new, innovative ideas that are born thanks to students' expertise on school environments and free-spirited creativity. The InnoArch -research made in Architectural school Arkki proves how innovative and creative the children and teens can be when given a chance.

How to use

Typologies as Methodologies

Typologies are presented as graphical, visual and simple design models in line with today's emerging trends. Common language – visual imagery – is understandable to every user and professional group. Since typologies are born out of participation of the users it is safe to assume that they also meet users' needs.

These typologies are rather robust three-dimensional models that illustrate themes and design philosophies from larger research fields. From this viewpoint one can see them as universal and idealistic. The more detailed a model is the less universal its usability is. Each of these school models serve as typological illustrators and communicators of a larger idea by visualizing it in a way that everyone can understand it.

The school typologies presented in this work can be used in visualizing the main school ideologies either as a two-dimensional chart model or as a three-dimensional model that visualizes shapes. The same approach has been used in 'The Language of School Design'; a book by Nair & Fielding. They have created two-dimensional design models for each space separately, ending up to larger entities. This is also how we did it in the Arkki workshops. Nair & Fielding named their models as Diagrammatic Patterns and Illustrative Patterns. This project was executed by professionals only and serves as manual for designers (Nair & Fielding, 2008)

The presented school typologies can break the language barrier between teachers, students or other professional groups and the designers. They can be used to demonstrate a discussion and as grounds for user-oriented brainstorming, that is, to support participative design. School typology is a simple and visual way to present elements and masses that constitute a school building, as well as entities that are created of buildings and outdoor spaces in between and around them.

School typology can be a starting point for individual modifications; for example the amount of clusters and courtyards between them can easily be varied, thus making the school building easy to modify.

The created typologies combine the shared trends and principles of 21st Century school design that, when illustrated, help both the school designers and the users to find and create a common design language.

In his book 'A Pattern Language' (1977) Christopher Alexander suggests that light should flow into a space from more than one direction. This interpretation stems from the way people experience their surroundings. As Alexander reflects his patterns and their compatibility he uses the concepts of density and profoundness of a building's functional complexity.

Cristopher Alexander compares well designed construction to poetry, as opposed to prose, because poetry can be understood in many different ways; ways that are much deeper than just the meaning of words. In the same way a well designed building can either tie patterns together without true coherence or combine the patterns in a way that creates poetry in the shape of a building. (Alexander, 1977)

References

Literature

Alexander, C. (1977) A Pattern Language. Oxford University Press. 1171 s. LCCC Number 74-22874

Care, L., Chiles, P. (2006) Primary Ideas – projects to enhance primary school environments. Department for education and skills. 88 s. ISBN 978-0-11-271183-9.

Ceppi, G., Zini, M. (1998) Children, Spaces, Relations. Reggio Children Research Center. 158 s.

Cold, B. (2002) Skolemiljo, fire fortellinger. Kommuneforlaget, Oslo. 71 s. ISBN 82-446-0910-9.

Dhanda, P. (2006) Schools for the Future – Design of sustainable schools, case studies. Department for education and skills. 105 s. ISBN 978-0-11-271190-2.

Dudek, M. (2007). A Design Manual – Schools and Kindergartens. The Deutche National bibliothek. 256 s. ISBN 978-3-7643-7052-7.

Dyson, A., Robson, E (1999) School, Family, Community: Mapping school inclusion in the UK, (Leicester, Youth Work Press in collaboration with the Joseph Rowntree Foundation).

Foster, A., Percival S. (2006) Schools for the Future – Designing school grounds. Department for education and skills. 117 s. ISBN 978-0-11-271182-7

Frampton, K. (1980) Modern Architecture – A Critical History. Thames and Hudson Ltd. 186 s. ISBN 0-500-20257-5

Manninen, J., Burman, A., Koivunen, A, Kuittinen, E. Luukannel, S., Passi, S. Särkkä, H. (2007) Oppimista tukevat oppimisympäristöt – Johdatus oppimisympäristöajatteluun. Opetushallitus. 155 s. ISBN 978-952-13-3438-2.

Meskanen, S. (2008) Future School - 2000 -luvun koulusuunnittelun teemoja ja typologioita. Master's Thesis in Architecture. Helsinki University of Technology, Department of Architecture. 238 s.

Miliband P. (2006) Schools for the Future – Exemplar designs, concepts and ideas. Department for education and skills. 120 s.

Nair, P., Fielding, R. (2007) The Language of School Design – Design patterns for 21st Century Schools. National Clearinghouse for Educational Facilities. 122 s. ISBN 0-9762670-0-4.

Patel, M. (2002) Schools for the Future – Designs for learning communities. Department for education and skills. 77 s.

Patel, M., Ischinger, B. (2006) PEB Compendium of Educational Facilities 3rd Edition. OECD. 181s.

Patel, M., Yelland, R. (2006) 21st Century Learning Environments. OECD. 111 s.

Staffans, A., Teräväinen, H., Meskanen, S. & Mäkitalo, A. (2008) Children's spatial experiences and collaborative planning and design process. Conference paper in "Architectural inquiries", Göteborg 24.-26.4.2008 .

Staffans, A. & Teräväinen, H. (2008) Collaborative planning and design as a bridge towards children's cultural learning and active citizenship. Conference paper in "EDRA 39" Vera Cruz 28.5.-1.6.2008.

Staffans, A. & Teräväinen, H. (2008) Collaborative planning and design constructing children's epistemic agency. Conference paper in "IAPS 2008". Rome 28.7.-1.8. 2008.

Richards, G. (2006) Bill Gates – The Road Ahead. 220 s.

Roth, A. (1975) La Nouvelle Architecture. 237 s. ISBN 3760880533.

Säljö, R. (2007) Lärande & kulturella redskap. Om lärprocessen och kollektiva minnet.

Teräväinen H., Staffans, A. & Meskanen, S. (2008) Collaborative planning and design and students' epistemic agency. Conference paper in "Designs for learning " Stockholm 3.-4.3. 2008.

Vygotsky, L.S. (1978) Mind and Society. Cambridge, MA: HARVARD UNIVERSITY PRESS.

Vygotsky, LS. (1962) Thought and Language. CAMBRIDGE. MA: MIT PRESS.

Wadsworth, A. (2006) Briefing Framework for Primary School Projects. Department for education and skills.
64 s. ISBN 978-0-11-271153-7.

Yanar , A., Korpelainen, H. (2001) Askeleita arkkitehtuurissa - Raportti arkkitehtuurin kansalaiskasvatuksesta. Suomessa.SAFA.

Internet

American Architectural foundation, publications. (2006-2007). Saatavissa:
http://www.archfoundation.org/aaf/aaf/Publications.htm

INNOARCH - Places and Spaces of Learning http://innoschool.tkk.fi/innoarch

Opetushallitus (2007) Tulevaisuuden koulu. Saatavissa:
http://www.oph.fi/attachment.asp?path=1,436,13979,65315,80078,80091

Valpola, T. (2005) Arkkitehtuurikasvatuksen kehityksestä ja oppimateriaaleista. Saatavissa: http://www.arkkitehtuurikasvatus.fi/yleista.php

Pictures

Photos of the workshops and students taken by Helena Teräväinen. p. 3,5,10,14,16,18, 20,22,26,30,34,36,38,40,42,48,50,52,59, 63,67,71,72,75&76.

Photos of the designs, plans & models taken and edited by Sini Meskanen

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