

INTEGRATED MODEL FOR TEACHING TO DESIGN COMPLEX HEALTHCARE ENVIRONMENTS IN ARCHITECTURAL EDUCATION

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ABSTRACT

This paper presents how analytical procedures, design methodology and reflection/evaluation are used in architectural education/design studios as an integrated method for teaching and learning healthcare architecture. The case reported is from Chalmers School of Architecture.

Healthcare is among the most complex architectural commissions there are. Many and often conflicting parameters have to be prioritized with many stakeholders involved. You are requested to create the highest architectural quality where you coordinate a good patient and healing environment, efficient and good working conditions and at the same time handle environmental sustainability and long-term facility interests. Furthermore, in hospital design both the scale and the briefs are large.

During the last three years the Healthcare Studio has developed, tested and refined a studio curriculum that interactively combines analytical and systematic procedures with explorative design exercises, literature studies and organized reflection. The Healthcare Studio works with commissions that are a part of “real” planning processes in one Swedish County Council together with clients and users. The studio has a design driven approach for understanding and coordinating the complex assignment. Design workshops are organized with the purpose to use design as an explorative tool. Interwoven with the design work studio themes are organized as study visits, lectures or literature seminars. Shorter events for reflection and evaluation are arranged between themes.

The quality of the result has been assessed by an internal and external architectural jury and client representatives in the healthcare sector. Evaluations of three years of this master’s studio show that the result are of high quality, both in relation to functional needs and architecture.

KEYWORDS: 1. Integrated learning, 2. Healthcare Architecture, 3. Complex environments

INTRODUCTION

Healthcare Architecture – from healing environment to functionalism and back again

The situation for creating high quality healthcare architecture has developed very positively during the last decade. In many ways this is a new situation and it has accordingly generated a corresponding interest among architecture students. Historically, healthcare architecture has combined an idea of a supporting environment with new techniques. In the earlier history of hospitals there was an awareness of good architecture and access to nature as important parts of constituting a healing environment for the sick. The emerging major hospitals in the late 1800s and early 1900s were technically very advanced (produced their own electricity, introduced central heating, kitchens and elevators). The physical environment was thought to have a healing effect. The buildings were often situated in park-like settings with plenty of greenery. Architecture and health were seen as a whole. It's design was an assignment for the most prestigious architects.

This changed gradually from the 1930s onwards. Following the introduction of functionalist design philosophy, healthcare architecture got a bad reputation and lapsed into being a commission with low status in the architectural profession during the second half of the 20th century (Kijssik 2009). During this period the design of healthcare buildings developed out of the linear and technically rational approach of that time. The internal functions of healthcare operations, inspired by a Tayloristic approach with separated specialties and operations dominated the programmatic requirements. The design drivers were rational flow and generality of an infinitely expandable structure. Patient experience came in second hand. Many of the hospital environments that we now perceive as dull and stereotyped have been developed from this design approach.

Today, there are several reasons for the rebirth of a more rich and high quality healthcare architecture. One important factor is that there is a renewed awareness of the possibilities for architecture to form a healing environment. Founded in research and articulated as "Evidence Based Design", the physical environment has been demonstrated to be able to promote health, reduce time for treatment, decrease medication and help to reduce the stress experienced by patients, their families, and the teams caring for them. All this opens up new possibilities for architecture to be an important part of the healing process instead of just delivering a functional structure where healing takes place. Another factor is the influence of and focus on the patient. They demand safe, welcoming and attractive environments that can support them and their families when illness comes into their lives.

The market calls for architects with interest and skill in healthcare architecture. That also creates an important pull. After decades of low activity, Sweden has today entered a period of new investment in healthcare facilities. This is due to two different trends. Firstly, an efficient and sustainable health care system is today increasingly important both nationally and internationally. Healthcare is changing rapidly due to constant new development in medicine, technology, nursing, rehabilitation and changing demand patterns. Swedish health care is consequently currently undergoing rapid and dramatic changes. Secondly, in Sweden, a great proportion of the existing hospital building stock is out-dated and difficult to adapt to new

demands. Due to these tendencies, society is forced to make high demands on the quality and cost of healthcare delivery. Healthcare architecture is today recognized as an important factor in reaching these goals. This wave of construction provides a great opportunity to create a new stock of high quality healthcare buildings.

Designing complex buildings – healthcare architecture

Healthcare is among the most complex architectural commissions there are. Many and often conflicting parameters have to be prioritized with many stakeholders involved. You are requested to create the highest architectural quality where you coordinate well-functioning layouts with a good patient and healing environment, efficient and good working conditions and at the same time handle environmental sustainability and long-term usability.

Furthermore, in hospital design both the scale and the briefs are large. Teaching healthcare architecture is further complicated by the speed of change and the collaborative planning tradition of healthcare facilities in Sweden. New forms of interaction in multi professional design processes are rapidly developing. A challenge for architectural education is therefore the dynamic methods in use for yet unknown and variable planning objectives.

Healthcare architecture is sometimes viewed as a sub-discipline within the architectural profession. Although a high general architectural skill is obviously important, acknowledged competence to design hospitals and other complex healthcare buildings in practice is limited to a number of architectural offices. Experience of similar types of project is an important selection criterion for pre-qualification and assignments in the field. The reason for this is the difficulty and complexity of the task. This applies to the complex functional structure of flows and spatial relationships, technological solutions and logistics. But another possible factor of even greater importance is the ability to manage the openness, uncertainty and dynamic interactions of the planning process.

Market demand for competence

After the long period of low activity and due to the reasons mentioned above, there is today a need for competence within healthcare architecture. Architects, with interest, knowledge and skills in the field are an important part of this competence. Since 1998, Forum vårdbyggnad (Swedish healthcare facilities network) has funded an adjunct professorship in healthcare architecture at Chalmers. The aim has been to stimulate research and teaching in the area. The professor has since been annually responsible for a master's studio and a number of master's thesis students. In this way new skills and competence, required by architectural firms involved in healthcare architecture, are supported by a stream of architecture students who finds employment after completing their degree. 2008 a new professor was installed and since then the authors of this paper have worked jointly with further developing the curriculum for the 15 credit masters course "Healthcare Studio".

PURPOSE OF THIS PAPER

This paper has the format of a reflective essay. Grounded in empirical observations it describes and reflects on how findings from design theory can be used practically in architectural education. Although teaching architecture certainly is not a new challenge, healthcare architecture in today's context demands more than just teaching the way architectural education always has been done. Healthcare architecture includes specific challenges due to its history, scale, complexity, extensive stakeholder involvement and dynamic planning process.

The purpose of the paper is to articulate basic theoretical and methodological assumptions, describe how these have been translated into practical teaching, report how they have been applied in the Healthcare Studio at Chalmers during four years 2008 – 2011 and reflect on the results. Thus, a theoretical and methodological discussion will hopefully be initiated on how architecture students, in relatively short courses, can acquire the knowledge and skills to work with healthcare architecture. At the same time the students acquire universal skills enabling them to work with sustainable large scale complex buildings, with the specific problems of systems design, structures, modules, etc.

CHALLENGES

In developing a curriculum for designing complex healthcare environments the Healthcare Studio at Chalmers Architecture has addressed five major challenges:

1. Healthcare architecture has during its post-war expansion acquired a reputation for being mainly functionally determined and consequently of low architectural quality.
2. In healthcare architecture there is a need for increased responsiveness to client and user needs alongside striving for higher architectural quality.
3. Rapid development in healthcare - spatial requirements develop as a learning process between client, users and the architect. Puts focus on the process.
4. In traditional architectural education, design as product (as a visual and graphic output) has a predominance over design as an interactive, dynamic process.
5. The important factor in turning experience into learning is reflection-on-action.

LEARNING GOALS

The Healthcare Studio has five major learning goals for the students. The overall goal is that they shall obtain general knowledge about and ability to design large scale and complex buildings (hospital buildings) integrated into the surrounding environment and urban setting. More detailed learning goals are:

- Knowledge, strategies, and methodologies to formulate visions for healthcare architecture, as well as practical skills to design and integrate an actual healthcare building.
- Ability to work interactively with complex programming, combining spaces for care, patient experience, work environment, logistics and architectural systems thinking.
- Understand healthcare architecture as a part of cultural and societal change as well as urban development.
- Understanding and being able to apply the concepts of Healing Architecture and Evidence Based Design.
- General insights into and practical skills in “Future proofing” and planning for continuous change – generality, flexibility and adaptability

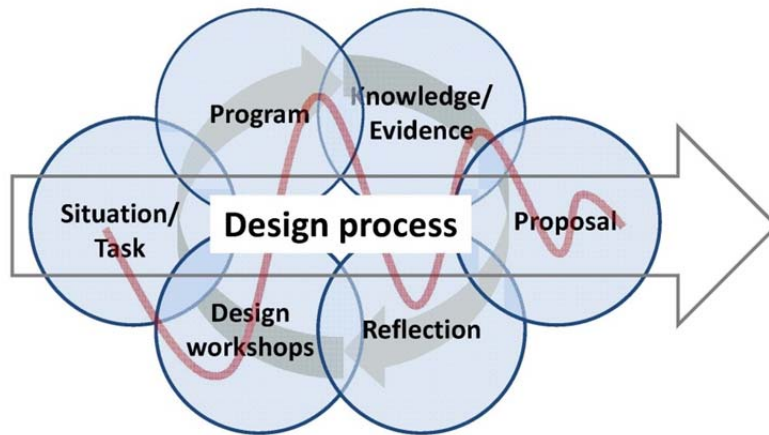
THEORETICAL APPROACH AND METHODOLOGICAL STRATEGIES

The Healthcare Studio has developed, tested and refined a studio curriculum that interactively combines analytical and systematic procedures with explorative design exercises, literature studies and organized reflection. The students work with commissions that are a part of “real” planning processes in one Swedish County Council together with clients and users. The studio has a design driven approach for understanding and coordinating the complex assignment. Design workshops are organized with the purpose to use design as an explorative tool. Interwoven with the design work studio themes are organized as study visits, lectures or literature seminars. Shorter events for reflection and evaluation are arranged between themes.

The Healthcare Studio has five pedagogical phases

1. Situation/task
2. Program design
3. Design workshops
4. Knowledge/evidence acquisition
5. Reflection

They are all important parts of an integrated model of teaching and learning to design complex healthcare buildings and environments. The elements are related to each other by methodological strategies.



Integrated model of teaching and learning in the Healthcare Studio

The design process is not linear. The arrow is the time line from project start to presentation of the proposal and examination. The blue circles are the five phases + proposal/result. The red curve represents the learning process which is nonlinear and moves between the different phases that mostly run simultaneously. The circle arrow represents the methodology that drives interactivity and integration by reflection in/on action.

Overall approach

The overall approach in the Healthcare Studio is to see architectural design work and learning as model making and reflection in and on action. Donald Schön (Schön 1987) describes the process of designing as a conversation with the materials of the design situation. He exemplifies it with the cycle of seeing-moving-seeing that a sketching architect goes through in her engagement with the models of her profession. Emanating from this approach, three methodological strategies have been developed as a model of design learning in the Healthcare Studio.

Methodological strategies:

1. Design learning as reflection in/on action
2. Collaborative design to support innovation and teamwork
3. Simplifying complexity by obstructing the perspective

Design learning as reflection in/on action

Design commissions can be viewed as problematic situations where it is initially quite unclear what should be achieved. They are often complex, confusing, uncertain and precarious, and problem formulation must therefore emerge gradually. A “designerly” approach thus means that you try something, consider how it works, reflect on other possibilities and then change and improve what you've done. This work is done step by step until a valid solution is achieved in time and under given conditions. Characteristic of a designerly approach is that

the work is embodied in some kind of sketch/model/artifact. It is the design artifacts that are the center of the design work.

Schön uses examples from architectural education to illustrate the design process. He believes that the creation of models plays a key role. The sketching an architect student does in a teaching situation with her teacher is also used as an example of the way the experienced practitioner “talks” with a material or situation. Design, according to Schön (Schön 1992) is thus seen as an exchange (“transaction”) with a design material in a design situation.

When the experienced architect approaches a specific task, she uses her repertoire of past experience of similar situations and examples – prototype and site. It is not a question of finding a single model. The examples or prototypes are abstracted to more general patterns, types and formats. These are matched against a corresponding abstraction of the actual design problem. In analyzing the results, the architect learns more about the problem. This also makes it easier to find appropriate patterns that can lead to good solutions. The situation talks back, and this process of interpretation - Action / Change - Interpretation (“seeing - moving - seeing”) occurs as a continuous “reflection-in-action”.

Collaborative design to promote innovation and teamwork

A linear and technically rational design method is insufficient to handle both complexity and simultaneous change of requirements. Today, with high rate of change in society and complex design challenges, the process must be interactive and collaborative to address more open objectives and constantly changing programmatic requirements. The teaching model in the Healthcare Studio is based on a design process that is initially workshop-driven. It includes collaboration between the students in different teams and constellations that develop design concepts through joint interaction. Workshops play an important role in sustaining innovative thinking as well as establishing teamwork. This addresses the change in the architect’s manner of working from an individual endeavor to teamwork. In the modern architectural office a key factor for success is knowledge sharing. (Fröst 2003)

The collaborative aspects of design work have been described by Bucciarelli (Bucciarelli, 1994). He introduces the term “object worlds” to describe the physical space including the artifacts within which the design work takes place. Object worlds also describe the mental “images” that the designers create in their minds as well as the actions they perform as part of their work. According to Bucciarelli an important part of the design process involves communication, negotiation and compromise. He argues that even though compromises are made each person still has her own perception of the design task and that this is rooted in her special expertise and responsibilities.

A commission dealing with spatial design is often initially vague. In healthcare architecture, the planning process involves many actors from different parts of an organization with a variety of perspectives, experiences and knowledge. Unclear notions allow themselves to be easily limited by the use of language, while a physical design demands firmer representation. From this perspective, one can regard the process of design as a transition from a sphere of abstract concepts towards a sphere of a more concrete character. This puts pressure on the

students to produce visual and hands-on tools for supporting their formulation of programmatic requirements. Therefore, the concept of Design Dialogues (Fröst 2004) has been introduced in the studio work. This results in visualization of the programmatic designs with diagrammatic artifacts and models in order to enhance communication internally and with the client.

Simplifying complexity by obstructing the perspective:

Our questioning of the technical-rational design models capacity to handle large and complex programs is based, among others, on the work of Jane Darke. She has performed a number of empirical studies of how design in practice actually is done. She (Darke in Cross 1984) conducted a series of interviews with English practicing architects who completed construction projects at five different sites in the London area. Her conclusion is that architects do not begin their work by seeking to obtain a complete list of key factors which have to be taken into account for in the project. Instead, they are looking for ways to delimitate the problem so that it is conceptually possible to handle as a meaningful whole. They focus on developing some goals/restrictions, in areas that they perceive to be particularly interesting and important for the project. These goals do not need to be consistent. They may consist of a mixture of thoughts and ideas based on conditions on the property, a desire to review a particular building type, the relationship to surrounding buildings and so on. These ideas serve as a "primary generator" and it is from these that initial sketches or proposals are developed. The proposals then have to be tested against the more specific requirements and restrictions, are refined and work their way towards real solutions. The early sketches are what Jane Darke calls the project's fundamental idea. Through this method the project gets a more solid base initially, limiting the number of possible solutions so that you can handle complex situations without drowning.

In order to support the students work designerly and with primary generators, "obstructions" are used as a pedagogical method in the Healthcare Studio. The goal is to help the students to simplify complexity by obstructing the perspective. A series of design workshops is arranged and the first of three is carried out directly in the first week. The purpose is:

1. Stimulate concept development and innovation.
2. Discourage excessive "function-driven" architecture.
3. Support knowledge building and learning. The immediate design work provides a basis for questions and surveys.

The methodological strategy is inspired and developed from the intentions behind the film *The Five Obstructions* (von Trier 2003) by Lars von Trier and Jørgen Leth. The five Obstructions is a documentary about the barriers that Lars von Trier implements in filmmaking together with lengthy sections of experimental films produced by the filmmakers. Von Trier's favorite film is Jørgen Leth's *The Perfect Human* (1967). The premise is that Lars von Trier has created a challenge for his mentor, Jørgen Leth, removing Leth's filmmaking comforts and conventions as part of the agreement. Von Trier gives Leth the task of remaking

The Perfect Human five times, each time with a different “obstruction” (or obstacle) given by von Trier.

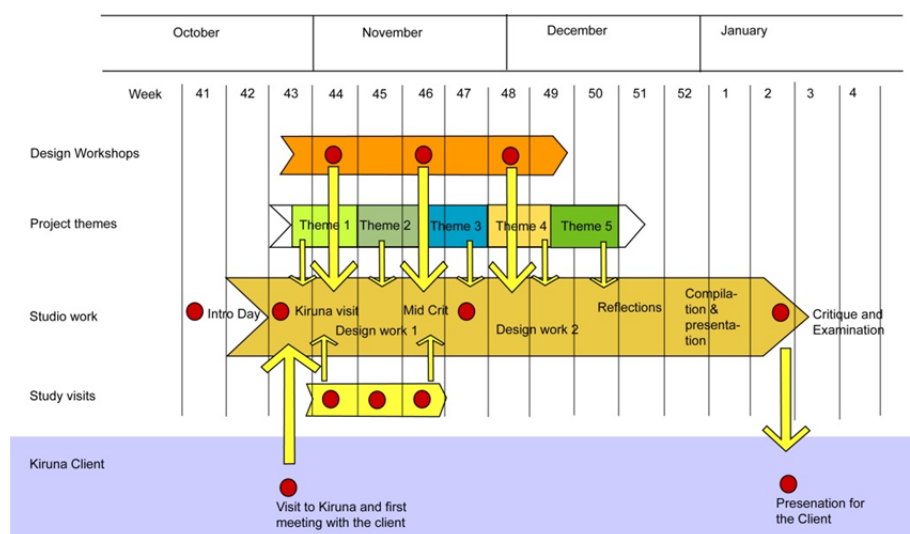
In the design workshops obstructions are used as a method to limit the different aspects and study the complexity in the project layer by layer (Patton 2010). In hospital design both the scale and briefs are so large that it’s necessary to break them down to be able to deal with the complexity. With the physical model as a tool in the design process the students work in different scales to investigate everything from the urban context and program to the modular system. The workshops are also used as a primary generator (Darke, J, 1979) to stimulate concept development and innovation in the proposals.

IMPLEMENTATION

Each year a new application project for the Healthcare Studio is carefully selected. Commissions are chosen that are part of “real” planning processes in one of the Swedish County Councils (landsting). A typical project is a new building or healthcare unit with a significant level of complexity and therefore enough of a challenge. The students enter the project in a phase where everything is still very open and they can gain from the engagement and interest shown by the client, healthcare staff and other stakeholders.

It also means however that there is no ready-made program to work after. In the County Council this work is done later, often in line with the development process of the healthcare operation itself. Today, older normative planning methods are unusable because the healthcare needs are changing too rapidly. Healthcare design in Sweden has moved from a prescriptive to a dynamic planning process. Developing the program together with the County Council is therefore an important part of the task for the students.

Studio process



Example of Studio Schedule

The studio is performed in six phases with the purpose to put forward a clear and productive design process. Interwoven with the design work are a number of studio themes. The themes can be study visits, lectures or literature seminars. Between themes are controlled events for reflections/evaluations/check points. The purpose of these is to ensure the input of other skills and issues such as critical reflection, theory and technology into the development of the design work. The learning from the themes is reported as a short essay by each group.

Situation/task

The Healthcare Studio begins with the students being confronted with the situation/task directly on Day 1. It is a trip to the County Council and the place where the building task is. Here the students meet representatives from the facility and planning organizations that is our clients. They also meet their "customers" that is, healthcare and its representatives - doctors, nurses and assistant nurses. They make a site visit, study the details of the plans, expectations, future visions and more.

The studio together with the client develops the program for the task. Materials from the County Councils are of varying level of detail. Students are thrown into a situation where a lot is still very uncertain. A realistic dialogue process with the client and users does not fit into the studio plan of 10 weeks. An organized collaboration around the program between the students is arranged instead. The studio is organized as an "architectural office" where its members help each other to gather and share knowledge and inspiration. The studio also cooperates in developing a joint basic program for the building. Each group of 2-3 students will then work further in an interactive and reflective way with its own program parallel with the development of their proposal for the building.

The architecture students are requested to accomplish the large scale commission and comprehensive program of high complexity in 10 weeks. There is therefore a danger that the students drown in the programmatic requirements. The risk is once again that architecture is based on function and flow optimization. Therefore the design workshops are arranged.

Design workshops

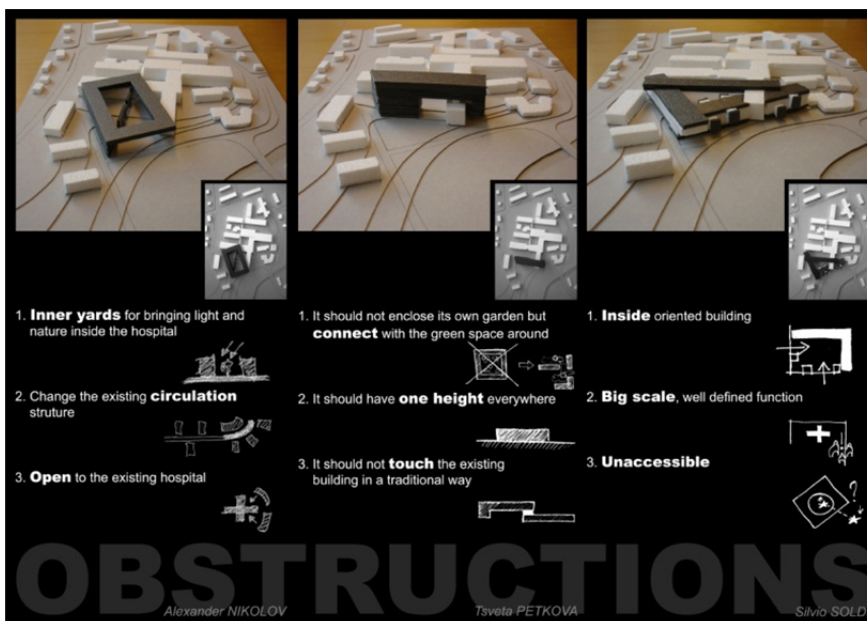
The architect Jean Nouvel often compares his role as architect with that of a film director and he has often said that architecture and cinema are very close. "Architecture exists, like cinema, in a dimension of time and movement. One thinks, conceives and reads a building in terms of sequences. To erect a building is to predict and seek effects of contrast and linkage bound up with the succession of spaces through which one passes," Nouvel explains. It's easy to draw parallels between the process of filmmaking and architecture. Architects and film directors have throughout the history been forced to rethink the story and characters within a new context. Architecture and film are both representations of a brief/manuscript in a specific context, working within a similar framework, trying to deliver a story in a convincing spatial configuration.

Lars von Trier mirrored himself in Jørgen Leth when asked Leth to remake his film 35 years later in the same way architects mirror themselves in earlier masters remake architecture,

creating new spatial configurations based on a similar story but with new obstructions. In the same way as Von Trier tries to move Leth out of his comfort zones, the workshops are designed to push students into new territories. As mentioned, to get the most out of the studio potential, knowledge sharing is promoted to develop proposals in different directions without creating a competitive atmosphere. The structure of the workshops also tries to create an interactive and dynamic process in the studio by moving between individual ideas and group work.

In the first obstruction, Von Trier challenges Leth to remake his 1967 film “The Perfect Human” in Cuba a place he has never been, without any set and with no shot longer than 12 frames (0.5 sec), answering the questions posed in the original film. The difficulty of these obstructions can be compared with the students situation of going to a site where they never been and working with a fuzzy program of a complexity they never meet before.

The first workshop deals with the context. The students are individually asked to make 3 statements on how they would like the building to interact with its context. These statements are then, as an imposed and surprising challenge, turned into the opposite, which creates the obstructions they are forced to use when building a physical model in scale 1:1000 in a specific material and technic. The obstructions on the filmmaking process were a technical problem for Leth, forcing him to use a very fast paced and unusual filmmaking style. Leth successfully completes this task by repeating and reversing film segments to create his narrative.



Design workshop 1, Eksjö Hospital 2009 by Aleksander Nikolov, Tsveta Petkova and Silvio Soldi

By reversing the student’s ideas into obstructions, they are challenged to investigate the unknown. This gives them a wide spectrum of solutions when they in the next phase work in a group of 2-3 students. In the group exercise the students work in the same scale but have the freedom to choose any obstructions, material and technics based on the learning outcome

from the individual exercise. From the new obstructions they are then asked to build a physical model together in the group and also make a visualization of the model in the context. By presenting their work and getting feedback on it they turn experience into learning as reflection-on-action (Shön D, 1992), before they continue to search for new structures in the second workshop.

For the second obstruction, Leth was told to film a dinner scene from *The Perfect Human* in a “miserable place” but not show that place onscreen (Von Trier, 2004). His new scene takes him to the “red light district” of Bombay. Von Trier requires Leth to film himself eating a meal in the open air of the “red light district”, yet hiding its existence. Seeing Von Trier’s obstructions as a psychological game, Leth remakes the film in the “red light district” of Bombay, only partially hiding it behind a translucent screen.

The second workshop deals with the program. The students are individually asked to present three statements on how they would like the program to relate to healing qualities. Qualities such as views of greenery and privacy are examples of aspects that have to be considered initially. The purpose is to avoid to functionally based approaches. The strongest obstructions usually lead to the most interesting structures. Therefore the students are advised to present three different categories for their obstructions and not only traditional architectural issues/subjects. One could for example have a more poetic character, one could be about what the building should communicate and at least one of the obstructions should seem to be impossible to achieve! The students are asked to build a concept model, so it doesn’t have to look as they imagine it in reality. They should use their creativity and be innovative to reach something unexpected. This time their statement isn’t turned into the opposite, instead they are asked to change statements within the group. They are then instructed to build a physical model in scale 1:500 with a specific material and technique. The obstruction to work with someone else’s statements diminishes individual prestige and opens up for a dialogue in the group. The individual models become translations of their own ideas when they then return to working in a group of 2-3 students again. Their answers will be the basis for the three obstructions in the group exercise. The students work in the same scale but have the freedom to choose any material and techniques. From the new obstructions they are asked to build a physical model together in the group and make a visualization of the model in the context. Again presenting their work and getting feedback on it turns experience into learning, before they continue with the third workshop.

Von Trier was not pleased with Leth’s framing technique in the second obstruction and posed two options for his third obstructions: a reshoot of *The Perfect human* in Mumbai as Von Trier described, or film *The Perfect Human* with complete freedom. Complete freedom is as challenging an option for Leth as a total reshoot. Rather than return to Mumbai, Leth chooses to remake the film in Belgium, filming in a noir style using split-screen effects.

The third workshop deals with structure/modules. By the third workshop the groups have developed their ideas into unique projects with different strengths and weaknesses. It can then be stressful to be forced into a certain direction if it does not suit the project. At the same time they are getting used to the obstruction method and start to become comfortable with being

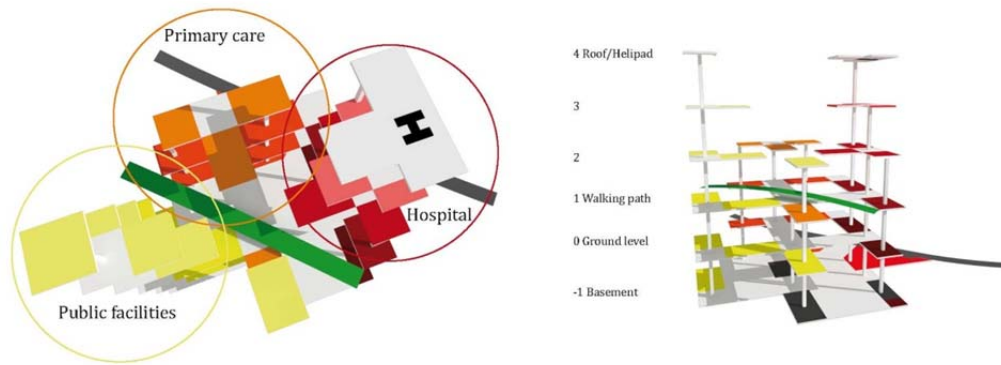
guided through the process. So in the same way as Von Trier gives two options for the third obstructions, the students are given a choice to work with structure/modules or to choose complete freedom and put up their own workshop with their own obstructions if that suits their project better. This time they are not forced to make individual statements but are given the opportunity to start up the group work and model making directly if they want. The students work in scale 1:200 and have the freedom to choose any material and technic. They should also present it with a visualization of the model in the context. Finally, they present their work to get feedback on it, thereby turning experience into learning, before they continue with the project.

Program design

In the early stages of a construction project, it is important to identify how the intended building can in the best possible way fulfill the needs of the client and their organization. For multi-faceted client organizations such as healthcare, building program issues are often extremely complex: space planning, organization, technology, care processes, treatment methods, patients' perspectives, staff considerations, and other factors must be weighed together as a whole.

The creation of a new building generates many fundamental organizational changes and many organizational innovations in healthcare take place in connection with the planning of new facilities. There then opens up an opportunity to thoroughly review the way things are being done at present and envision new ways. To make this happen, a planning process is often applied where visions, requirements and spatial solutions can develop in parallel. By using design methodology it can for example be possible for care professionals, unskilled in spatial design, to effectively interpret and handle a very complex spatial situation while they at the same time review and discuss their own way of working. Functional demands are in this way formulated at the same time as spatial solutions are being developed, providing new insights into how problems might be resolved. This is a strong disincentive to begin the process with fixed spatial requirements. It also makes the initial stages all the more complex and comprehensive.

This situation is not unique to healthcare projects, though it is most obvious here due to the extremely multi-faceted and rapidly evolving nature of healthcare. The same tendency may be identified in all sectors of society. Increasingly, clients provide conflicting information, struggle to give clear answers and put off taking decisions until the last possible moment. Many actors in the construction industry consider this a significant problem. The Healthcare Studio takes an alternative view, however, and see this as an opportunity to teach and learn new skills, tools and processes that respond to the real-world conditions of today.



Kiruna new hospital, Program distribution. Anna Larsson, Sofie Strandberg and Yalda Boozari

Consequently, in the studio, several dynamic ways to acquire the programmatic requirements are used. They are not fixed from the beginning, but emerge in the encounter between the initial formulation of needs and the emergence of various proposals and visualized possibilities. The program is flexible for each group in the studio. In order to refine a design concept you are required to make priorities between various programmatic requirements. The students work in two phases with the program. Initially, with a basic program that includes the main functional parts, flows and relationships. All the students work together with this in the studio. The detailed program is then developed in the different smaller project groups in parallel with the development of the proposals. They have to “design” their own program. It is important however, to complement this designerly approach with more rigorous analytical methods for getting hold of and structuring all requirements. Joint discussions and fact finding is supported by the teachers.

Knowledge/evidence

As the goal is to achieve general applicable skills in architecture, the application project is always a starting point for several broader discussions. The studio based teaching needs to be supplemented by topic-based and structured knowledge acquisition. This is particularly true for complex activities such as healthcare where many types of knowledge must be incorporated. The studio therefore works with a number of themes that are interwoven in the studio work through lectures and literature seminars. Examples of themes are:

Healthcare Architecture and its role in Society. Architectural development, its forms and spatial solutions, meets the ideologies and cultural images of illness, healing and care. Pharmacology, treatment methods but also the view on what a human actually is - all are part of the forces that shape the spaces we build in order to cure and care for the ill. The very institution of the hospital has its societal origin. Also the physical location of hospitals - in the center of the city or the outskirts of towns - is rooted in the image of disease in the community. Founded with the purpose to take care of the sick and poor and move them out from the cities, the hospital of today seek its way back to the urban life and its functions integrated into people’s everyday life.

Future Proofing – adaptability, flexibility and generic space. A sustainable approach to the design of health care facilities is essential to maximize the long term effectiveness for the whole life of the facility. In developing a sustainable design solution, a range of factors must be considered. While each can be assessed initially in isolation, ultimately they must be considered together. A good understanding of the process of delivering care in different settings will then point the way to the appropriate building shape and level of environmental technology. The goal must be to create a sustainable facility that is capable of being adapted to changing circumstances and which provides a healing or therapeutic environment. In this theme the questions of generality, flexibility, adaptability, changeability together with energy efficiency and how to reduce environmental impact of buildings are studied.

Healing Architecture and Evidence-based design. Evidence-based design is the process of basing decisions about the built environment on credible research to achieve the best possible outcomes. This is a method that is uniquely suited to healthcare because of the unusually high stakes and the financial and clinical outcomes that can be impacted by the built environment. The building itself can help to reduce the stress experienced by patients, their families, and the teams caring for them. The healthcare environment is a work environment for the staff, a healing environment for patients and families, a business environment for the provider of healthcare, and a cultural environment for the organization to fulfill its mission and vision. Evidence Based Design can provide the architect with arguments for high quality architecture with knowledge gathered from many fields.

Reflections

Between phases, shorter events for reflections/evaluations/check points are held. The purpose of these is to ensure the input of other skills and issues such as critical reflection, theory and technology into the development of the design work. In the workshops and/or other presentations the students are requested to work with delivering sketches promptly and other architectural design materials continuously. This is a key ingredient in the Healthcare Studio method and the far best method for students to solve the studio commission and get feedback from teachers. To stimulate work on the conceptual level it is also important, as mentioned earlier, to work interactively and investigative with the program. Here the parallel theme discussions and different workshop methods work as reference and inspiration.



Proposal for a new building for Psychiatry in Linköping by Isaak Strandell and Peter Sallmén

OBSERVED RESULTS

Our conclusion is that the curriculum and methodological strategies implemented in the Healthcare Studio during the last four years has supported a good result. The observation is based on given grades, interest and appreciation from the surrounding society and students own evaluation of the course.

The quality of the results has been assessed by a jury at two different critiques. Critique is based on delivery requirements - reports, posters, models and presentations. The jury consists of internal = course teachers + one external architect. Sometimes also client representatives from the healthcare sector attend. Evaluations of four years of master's studio show that the quality tendency is rising and that the results today has a high quality, both from a narrower functional perspective and as architecture. The course evaluated by the students after completion in the Course evaluation rating the "overall opinion of the course" gives a mean 4,79 points in a scale from 1 = very bad to 5 points = very good. This must be considered a comparatively high result. The outcome from the studio has gained interest from surrounding society. Students have every autumn been invited to present at Forum vårdbyggnad (Swedish healthcare facilities network) conferences. There has also been frequent media interest shown in newspaper articles, radio and local TV coverage. Every year the Healthcare Studio is invited to arrange exhibitions and during summer 2011 visitors to Kiruna Municipal Hall could see the student's proposals for a new hospital in Kiruna.

FINAL REMARKS

Dyrssen and Billger (Dyrssen, C, Billger, M, 2005) have argued that rhythmically combining different modes of inquiry – open, intuitive, gradually - together with a - deductive, logically arguing and verifying – can promote working processes in both design research and advanced design projects. In the Healthcare Studio the experience from this integrated way is mainly positive. A risk is however, that the students perceive some moments as confusing. The integrated, dynamic curriculum pleases demands on a very clear and well-structured process.

As one method in the Healthcare Studio, obstructions are used to simplify the complexity. This is done by looking at different aspects separately and in a designerly way before putting them together in one complex structure. The notion that a project's fundamental ideas develop early in some sort of "pre-design" to reduce complexity is also observed by Peter Rowe (Rowe 1987) which describes a close study of the emergence of a number of architectural projects. He there shows the importance of early ideas imposed from outside the design process used to clarify the actual content of the design task. He also shows that architects often find it difficult to abandon these models which are really a kind of aids. This applies even when they prove to be difficult to reconcile with the program and give rise to complicated and unnatural solutions. This is a phenomenon that sometimes is observed in the studio.

It also happens that students fight the given obstructions rather than embrace them as opportunities to try something new. If an architect doesn't dare to take risks, process and

result become predictable. The workshops are designed to push students into new territories, to explore alternatives to what they would normally, easily, and predictably do.

In the Healthcare Studio questions and research are regarded as just as important as the answer. The traditional focus on the final results is therefore supplemented by careful attention on the process. A supreme goal is to provoke the students to force “truth” from the context and thereby learn. The feeling among the students of “Today I’ve experienced something that I’ve never thought of before” (Von Trier, 2003) should be accomplished every day in the Healthcare Studio.

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