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Hidden realities inside PBL design processes: Is consensus design an impossible clash of interest between the individual and the collective, and is architecture its first victim?

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ABSTRACT

How do architecture students experience the contradictions between the individual and the group at the Department of Architecture and Design of Aalborg University? The Problem-Based Learning model has been extensively applied to the department's degree programs in coherence with the Integrated Design Process, but is a group-based architecture and design education better than that which is individually based? How does PBL affect space, form, and creative processes?

Hans Kiib, professor and one of the founders of the Department of Architecture and Design in Aalborg, describes his intentions for the education as being intuition, reflection, artistic progression and critical interpretation (Kiib 2004). "As the reflection and critical interpretation are well integrated within the education, mostly parts of the exam evaluation, it seems like the artistic progression and intuition are somewhat drowning within the group work, as it is closer related to the actual PBL process". Is the Integrated Design Process (Knudstrup 2004) and is Colb (1975) still current and valid? Can we still use these methodologies when we must create "learning for an unknown future," as Ronald Barnett (2004) claims that we are passing from a complex world into one based on super complexity? Could Gaston Bachelard (1958), who writes in his book The Poetic of Space "that poets and artists are born phenomenologists," help architecture and design students in their journey to find his/her own professional expression?

This paper investigates the creative processes of the collective and the individual and clarifies some of the hidden realities behind the PBL-based creative processes, both through an inquiry with the students and a more methodological and theoretical approach. The paper also explores how to integrate artistic progression and intuition within group work by investigating a group of concrete project cases from the Department of Architecture and Design based upon the following points:

1) *How can a PBL group-based learning environment based on a dialogical consensus ensure that everyone is working towards the same goal?*
2) *Does consensus architecture secure a necessary analysis and interpretation of the context, or does it create a grey consensus architecture based on compromises?*

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3) *Does the PBL-method evoke a certain expression in space, form and materiality, but perhaps exclude other (possibly better) solutions?*
4) *Every group's work depends on the interplay between the personalities of the individuals and the group. How does this interplay affect the creative process?*

This paper seeks answers to the initial question "Is consensus design an impossible clash of interest between the individual and the collective, and is architecture its first victim?" and suggests new possible methodological tools for the architectural design process that secure the level of quality in design education.

Keywords: PBL, design process, flow and conflict, intuition, innovation, and experiment.

THE BLANK PAPER: REFLECTION AND BIAS – IN ACTION

The following cases are based on my work as supervisor and as a semester coordinator for our 1. Sem. At Architecture and Design at Aalborg University and it is based on all my activities with the students during the semester both written text in their semester reports and process evaluation reports, and the verbal dialogue, supervision, examination, and semester evaluations meetings. To each group meeting and supervision has a written agenda and the whole process is documented in text, images and physical models at the final examination. Each semester is a beginning from scratch where we together with the students begin a journey into the hart of the design process both the individual and the collective.

When the students start their first semester most have no knowledge or understanding of the design process and their academic vocabulary is very small. They think and speak very differently from more advanced students and they do not always understand what their supervisor says.

Their ignorance is expressed in many ways, like when they are asked to create a perspective drawing of a place or a house in an urban setting. A common problem at this stage is that they often create their drawings as if they were flying eight meters above the house or house, but they are actually sitting on the ground and sketching at eye level. They simply do not understand how a perspective drawing is done, where the horizon is, or where perspective point are.

They do not even see what is in front of them; it is as if they were temporarily blinded. As beginners, they have common unspoken idea based on their naive bias or a vernacular aesthetic, which is typical for amateurs and nonprofessionals.

The students do not look at the site and the world when they draw. They look at their drawing and draw as they imagine how the world looks, as if in a dream. In reality, they are sitting in a daydream and do not look at the "reality"; they think that they know it in advance, and do not need to look more closely. Their visual language (vocabulary) is small and naïve until they get into a dialogue with the supervisor about the drawing, draw together, and create the horizontal line and perspective points. Then they say, "Oh yes of course." It is in the design process with the new students that we find words through a common experience in both drawing and making working models. The student shows me a drawing and I say, "Try this way" and he/she draws it to see what I think. Together we "reflect – in – action" through drawing; we discover how the design process is a journey and an experiment that constantly provides one with new options.

The image and the drawing is essential, not only when the supervisor and the student draw/work together but also when the students try to explain something through a drawing in order to find a solution to a design problem. The design process and the language are carried by the images when we cannot use words, which are not always enough. There must be a match between pictures and text so that they can support each other and create a synthesis.
But there is no point in learning to construct a perspective sketch if you cannot forget it, it is just an invisible constructed grid behind the image you see, and you must see trough that and beyond.

FOUR CASES ON THE EDGE OF CONSENSUS AESTHETICS - IS ARCHITECTURE THE FIRST VICTIM OF CONSENSUS?

We turn now to four cases of first semester student projects that centered on the minimal housing theme. All are cases where the clash between the individual and the collective ended up differently, some where the lack of consensus destroyed the project, and some where form, function, concept and aesthetic made it a success. Of greatest interest are the cases that was a failure and why they went wrong, a rare example is the group that reflected and improved on the project after they took their exam, which was unusual. Normally the exam is the definitive end of the project due to the tight schedule of the academic calendar, which leaves little time to hesitate and reflect further on one's work.

The students' task that semester was to create a colony of small harbor houses. The project was described as follows:

> In the project module, the student should individually prepare a conceptual design of a harbor house and, together with the project, assemble buildings in a colony of harbor houses. Project module consists of two parts that must be resolved coherently - the design of a harbor house (to be done individually) and the design of a colony of harbor houses (which is solved in the project). During the project module, the project team work with their port houses from a specific context, which is one of the two selected land at "Vestre Marina". Within this defined area, the project team develop a construction plan, which then will form the basis of each student design a separate proposal for a 'harbor house'. The 'harbor house' must be contextually relate to the other group members design and form a small colony of 'port houses'. There will also be a special focus on the space between the small port houses, squares, passages, public versus private, etc. (BSc01 2013 studieplan p.68)

The four groups we examine in this paper are:

1. "Shantytown" - When the group cannot decide and agree on a concept and a set of "design parameters", the few parameters drown in the diversity of the settlement and the project ends up in chaos.

2. "The orangery" - The design concept was so strong and the design parameter was so precise that form and function created a synthesis. Here all the individual houses had to be the same size, consist of the same materials, and have the same function; together they were part of a big glass house called the orangery. It consisted of seven small minimalistic wooden houses for seven botanists, which was a very nostalgic and sympatric concept.

3. "Hexagon square" - A case, based on three group members, that was very strong in concept design, technical drawings and 3D visualization. This was also a very strong concept in form materials and function but was still three individually designed houses based on the users' demand and profession.

4. "Seven pyramid stumps" – In this case, the group agreed on a strong concept but the concept was so strong that it overruled the needs of the users and became a form for form's sake; in other words, it became a project where the user was secondary in importance. However, after the exam the students developed it further by putting it through a new loop of design that focused on the users.

The first three groups completed the project with their exam, which is normal, given the tight curriculum. Only group 4 - "seven pyramid stumps" - was able and willing to take the project through a new loop after the exam.

First we must discuss the phenomenological, pedagogical and methodological aspects of the flow of the semester. The phenomenologist Gaston Bachelard explains the spiritual aspects of the design process the PBL methodology is a fundamental tool for us as architects and designers to transform the phenomenological experience into real design. But there is no safe way to for us. Ronald Barnett claims that our schools and universities are passing from a complex world to a world based on super complexity; here everything is uncertain, fluid, and unknown we will look into that later, first we look into the intuitive part of the design process.

FIRST, YOU MUST LEARN AND THEN YOU MUST LEARN TO FORGET

First, you must learn, and then you must learn to forget what you have learned. "Take a walk on the wild side", you must be free to experiment and trust your own senses; the university should not create uniformity but rather a multiplicity of possible perspective and interpretations of a constantly changing and super complex world. We all need to find our own "voices" or personal approach to the world.

Most of us do not think of the world as constructed, we see it in the same way as the medieval icon painters who painted a world without perspective as flat 2D images. It was not until the Renaissance that artists and architects such as Filippo Brunelleschi and Leonardo da Vinci figured out how to construct a central perspective based on hard work and myriad experiments.

Does this mean that we have a medieval world view? Perhaps, but it is essential that we view the world in more than one way so that we can change optics or position; so that we can see from several perspective points at the same time; and so that we can see the world as a whole. Cezanne, who was one of the first Cubist painters, described his working method in this way:

"The landscape thinks itself in me, and I am its consciousness" (Kearney, R 1994).

Picasso and Braque followed Cezanne's rebellion and worked on their analytical cubism between 1909 and 1912, painting portraits and pictures of Paris based on simultaneous and different perspective points, so that the images contained several layers of view of the same place seen from different perspectives. At first glance, it seemed as though their pictures were flat abstract images; that they had created a "frontality", that stops you from experience the classical perspective you are used to with one horizontal line and a simple perspective point. However, if you stood long enough in front of one of their paintings and immersed yourself in

the picture, you could suddenly see the same thing from several sides at the same time; in other words, you could see all layers simultaneously.

This was a revolution against the classic Renaissance subordinate linear perspective, which immediately revealed everything to the viewer. What we need is to be able to move freely between and work with medieval iconic 2D faces, the 3D images of the Renaissance linear perspective, and the analytical cubist images based on simultaneous perspective points.

Gaston Bachelard stated: "Imagination is always considered to be the faculty of forming images. But it is rather the faculty of deforming the images offered by perception, of freeing ourselves from the immediate images; it is especially the faculty of *changing images.* If there is not a changing of images, an unexpected union of images, there is no imagination, no imaginative action." Imagination is a place of solitude and connection with the world; it has a poetic language of its own where reverie becomes real, where 'poetry nourishes within us reveries which we have not been able to express.*'* (Bachelard 1960 p.159) According to Bachelard, we can deconstruct and break down the world into new multilayered pictures as Picasso and Braque did, and we must do as Jean Lescure says: "Learn and then forget all simultaneously". (*Lescure, J. Lapicque, Galanis, Paris, 123. 1956).* Cities are chaotic kaleidoscopic collages imbued with a sense of life, space, sound, images, tastes, smells and events; cities are moving images. The city is simultaneous film in transparent pictures, layers of different views, and perspective points. Our life is an experiment and experience gained only through aesthetic interaction, as Herbert Read (1956 p. 192) says in his book "Education through Art": "The progressive apprehension of, and comprehension of our environment, is only possible by means of aesthetic patterns. Experience only falls into *artistic shape.* Consciousness is only socially integrated in the degree that it is an aesthetic appreciation of reality."

BACHELARD AND "THE POETICS OF SPACE", A METHODOLOGY FOR THE INTUITIVE DESIGN PROCESS

> My eyes already touch the sunny hill,
> going far ahead of the road I have begun.
> So we are grasped by what we cannot grasp;
> it has its inner light, even from a distance –
> and changes us, even if we do not reach it,
> into something else, which, hardly sensing it,
> we already are;
> a gesture waves us on, answering our own
> wave ...
> but what we feel is the wind in our faces.

"The Walk" by Rainer Maria Rilke (1924)

French philosopher and phenomenologist Gaston Bachelard writes in his book The Poetics of Space "that poets and artists are born phenomenologists" (Bachelard 1958 p. xxviii) but how do we describe an architecture and design student's journey to find himself and his own voice? Can you learn to be a phenomenologist?

To Bachelard the house is the center, the vessel and space that carry our memories in his "La Poétique de l' space" he describes it in the context of our ability to daydream, through numerous examples of poets/artists interpreting poetry and stories. In the book, he examines a phenomenon he calls "the happy room", the room where we yearn and love, the poetic space he calls "Topophilia" (from the Greek ‘topos’, meaning place, and ‘philia’, meaning love), meaning to have love and affection for a particular place as part of our cultural identity and sense of where we belong. In Austria, Switzerland and Germany the word “Heimat " is reminiscent of the English word "Homeland". "Heimat" was abused by the Nazis in their attempt to create a special pure Aryan space, place and landscape. Together with "Blut und Boden" (“blood and soil”), another of their slogans, they used “Heimat” to remind us what our origin, homeland and identity is based on.

Bachelard takes a psychological point of view when examining the ideas, images, words and metaphors we use to describe the intimate poetic of feeling at home. In a number of his books ("Water and Dreams", 1942; "The Psychoanalysis of Fire", 1937; and "Air and Dreams", 1943), he describes and analyzes the poetic space as part of his great phenomenological project, our relationship to landscape, dreams and the four elements – water, fire, earth and air. However, "The Poetics of Space" 1958 is in many ways a summary of his studies, philosophical reflections, and phenomenological method.

Bachelard asks, "how can secret rooms, rooms that have disappeared, become abodes for an unforgettable past?" (Bachelard 1958 p. 6) How can it be that we in our daydreams creates spaces that do not exist, that we attach more importance to than the spaces and places that actually exist? Our commemorative space is a major and important construction of our identity and of greater value to us than actual physical space; emotional space has a greater impact than real-world objective space.

Swiss psychiatrist CG Jung described the complex and labyrinthine task psychologists must undertake when describing our psychological space, which, he said, was like the soul of a house:

> We have to describe and to explain a building, the upper story of which was erected in the nineteenth century, and a careful examination of the masonry discloses the fact that it was reconstructed from a dwelling – tower of the eleventh century. In the cellar, we discover Roman

> foundation walls, and under the cellar a filled-in cave, in the floor of which stone tools are found and remnants of glacial fauna in the layers below. That would be a sort of picture of our mental structure (Jung 1928 p. 118).

Our soul is a house; our memories and dreams are "living rooms" or places in our house; we have windows, doors, cabinets, drawers and keys to the secret room, word concepts, and metaphors we use when we describe our space of memory and childhood.

House, patch of meadow, oh evening light
Suddenly you acquire an almost human face
You are very near us, embracing and embraced.
Rainer Maria Rilke. Letters 4th year, Nos. 14-15.16 p. 11

We console ourselves, as the poet Rainer Marie Rilke did, by reliving memories. They are a protection against oblivion, and give us a sense of possessing an inner personal core, a foundation. Here we keep the images that perhaps slowly change over time. "Topophilia" is not a place but rather a feeling; we are poets who can weave tapestries of an era that never comes back.

"Memories of the outside world will never have the same tonality as those of home and, by recalling these memories, we add to our store of dreams; we are newer real historians, but always near poets, and our emotion is perhaps nothing but an expression of a poetry that was lost" (Bachelard 1958 p.6)

Bachelard believes that by using our poetic imagination we have a methodological opportunity to explore alternative realities. Bachelard's phenomenological method and approach to the world through poetry shows that nothing is stable and that everything is in flux; it is through our imagination and daydreams that we can access an "authentic reality" in the sense of the reality that matters to us. Our daydreams and fantasy are one of the strongest weapons we have and are how we shape and create the world, where the future folds out.

> By the swiftness of its action, the imagination separates us from the past as well as from reality; it faces the future. To the *function of reality*, wise in experience of the past, as it is defined by traditional psychology, should be added a *function of unreality*, which is equally positive. Any weakness in the function of unreality, will hamper the productive psyche. If we cannot imagine, we cannot foreseen (Bachelard 1994.p. xxxiv).

If we cannot imagine or daydream we will not be able to find direction in a chaotic world. Bachelard's phenomenological method describes how our ability to see what is not there is both our operation and foundation, dreams and poetry create the world. The French poet Jean Lescure said that freedom came through art and that it is in the autonomous moments that we find freedom, and it is not enough to be academically trained. ”Knowing must therefore be accompanied by an equal capacity to forget knowing. Non-knowing is not a form of ignorance but a difficult transcendence of knowledge. This is the price that must be paid for an oeuvre to be, at all times, a sort of pure beginning, which makes its creation an exercise in freedom” (Lescure p. 78 1956).

In order to achieve freedom and success you should make yourself independent of the skills and knowledge you have. True knowledge and insight come from forgetting everything you have learned, according to Jean Lescure, and using "the function of unreality." Our sense of the unreal, utopic poetry, and other parallel realities are our true core.
“An artist does not create the way he lives, he lives the way he creates.”
Jean Lescure Lapicque, Galanis, Paris, p. 123. 1956.

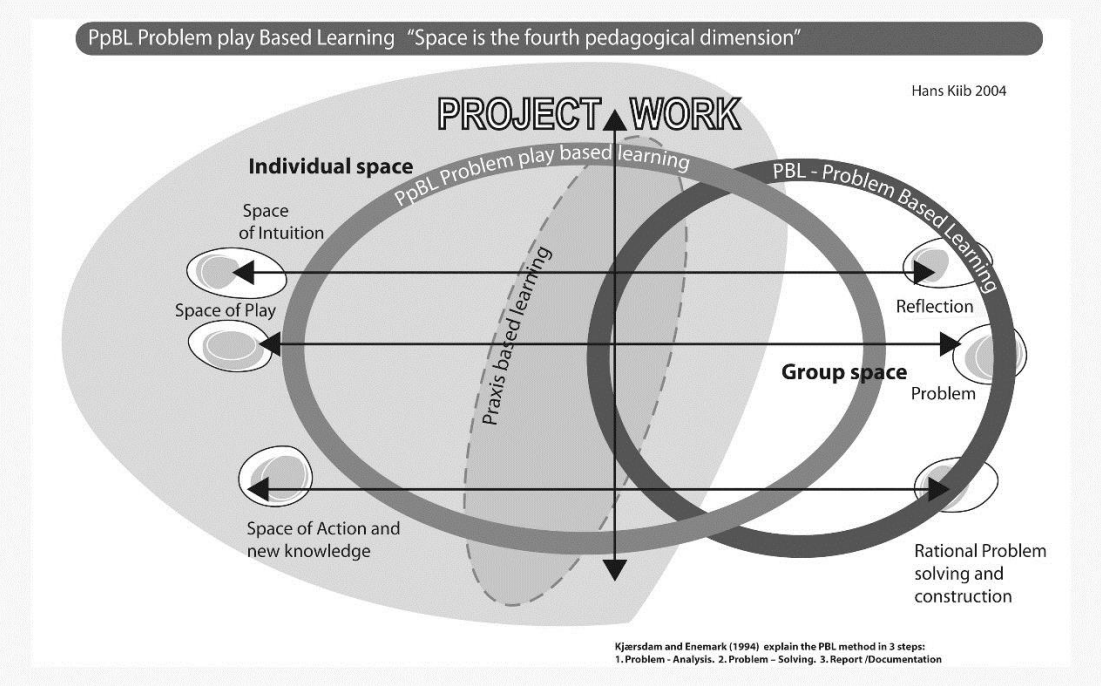
INTRODUCTION TO PBL AND THE CREATIVE PROCESSES

"There is no such thing as a neutral education process. Education either functions as an instrument which is used to facilitate the integration of generations into the logic of the present system and bring about conformity to it, or it becomes the 'practice of freedom', the means by which men and women deal critically with reality and discover how to participate in the transformation of their world."

(Shaull.1999 p.5)

The Aalborg PBL model is a combination of problem-based and project-organized approaches and is based on the old theories of Piaget (1974), Dewey (1933), Lewin (1948) and the new theories proposed by Kolb (1984) Gardner (1993) and Kjærsdam and Enemark (1994). Graff and Kolmos (2003) explained problem-based and project-organized learning in three dimensions, i.e. “*learning is organized around problems*”. *Experience learning* is a part of working to solve a problem. The content approach is based on *“inter-disciplinary learning,”* meaning that the solution may span traditional, subject-related boundaries, professions and methods. Finally, “*social learning,”* based on team learning PBL, is also student centered, self-directed ownership of the learning process. Used at Roskilde and Aalborg Universities, PBL is also a product of the so called critical pedagogy, which is based on experience based learning as originally developed by the German critical theorist and philosopher Oscar Negt (1975) and the South American education of peasants formed by Paulo Freire and his “Pedagogy of the Oppressed” (1970). The PBL model also has links to

Maastricht University and Lindköping University, which introduced the same principles during the same time period.



The core of project-organized, problem-based learning is described in the booklet "The Aalborg Experiment Kjærsdam and Enemark" (1994), which explains clearly and simply the principles of the method in three steps on three levels:

Literature - Lectures - Group studies

1. Problem - Analysis
2. Problem - Solving
3. Report/Documentation

Tutorials - Field studies - Experiment

Knudstrup (2004), from AAU's Department of Architecture and Design, explains the complexity of a typical primary project at A&D based on PBL. It contain such aspects as: rules for group work, user profile, function, plans in 2D and 3D, building program, construction principles, climate screen, ventilation, indoor climate, sun and wind conditions, local and national legislation, architectural concepts and volumes, architectural references, and architecture as an aesthetic endeavor. What is not included in the project is what runs the world outside the university as economic and the actual ongoing process with the client and user, who is the real boss. That part of our profession is what the supervisor and teachers try to simulate.

The design should be beautiful and combine form and function but reaching that point requires a combination of creativity, analytical and technical resources, as well as aesthetic qualities based on a strong foundation of technical competences - together with all the above-mentioned aspects. In one word: complexity.

Knudstrup launched her "integrated design process" (IDP) as a method within the PBL process where the students are taught both by architects and engineers based on a simulation. The core of the IDP is based on five PBL steps, and is an extension of the Kjærsdam and Enemark (1994) model:

1. Problem formulation/project idea
2. Analysis phase - site, context, user profile, energy consumption, construction and aim of the programme
3. Sketching phase - concept, construction, user, and function
4. Synthesis phase - all aspects combined: aesthetics, function, construction, and user
5. Presentation phase - 2D, 3D and physical model and visualization

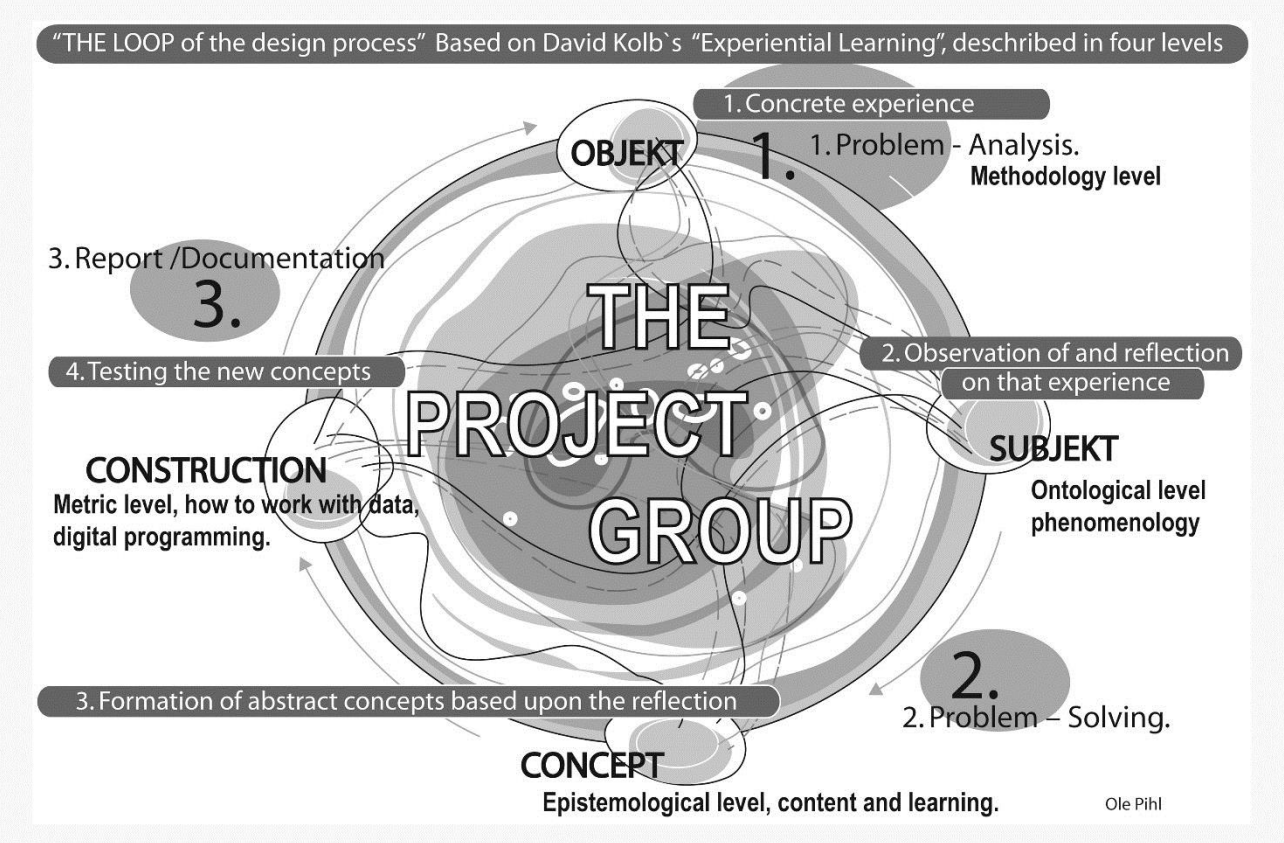
However, while the "Integrated Design Process" is a simulation of reality, it does not integrate real things such as the client, economics, competition, and time and. What the IDP-PBL process lacks in reality it offers in theory and methodology but is IDP really as integrated as Knudstrup claims? What happened before the 2004 invention of "the integrated design process"? How did all the architects and designers practice integrated design without knowing what it was?

If we take a closer look at the realities of PBL and IDP we realize that PBL is based on the spoken and written word, not on images; thus, there is a fundamental contrast between the eye and the intellect. Architecture begins as a daydream that comes to us without words and has long existed outside the world of higher education. Kiib (2004) suggest an experiential and playful way of learning; by introducing Problem play Based Learning (PpBL).

The experiential way of the PpBL focuses on the meaning and function of "space". In this connection, we perceive "space" as "the fourth pedagogical dimension, beyond those of the didactics of professional discipline, the project-based and the problem-play based" (Kiib 2004). This is a beautiful utopia, where everybody are happy and students from all semesters, supervisors and researchers are close in contact. PpBL takes place in rooms with high ceilings and perfect light conditions. Kiib keeps the notion "play" open to a wide range of interpretations, but depends on Kolb's definition of the design process as a loop based on experience and reflection.

Further ahead in this paper we look at a group of actual cases that explain how this loop of experience and reflection works within the PBL system and the problems involved in taking aesthetic decisions as a group. Both Kiib and Knudstrup refer to Kolb and his five levels of learning. Kolb (1975:45) explains in his book "Experiential Learning" how to use the hermeneutic circle and unfold the intuitive sketch process. He also describes how the loop unfolds between experimentation and reflection. Kolb's learning system is based on four main four elements:

- Concrete experience
- Observation of and reflection on that experience
- Formation of abstract concepts based upon the reflection
- Testing of new concepts
- Repeat (the loop continues)



We recognize Kolb's four levels of experience and reflection embedded in the PBL loop: 1. Problem – Analysis. 2. Problem – Solving. 3. Report /Documentation. Furthermore, Kolb (1975) developed four distinct learning styles and explained that we prefer different learning styles because we each have a different motivation and focus that determines how we perceive and learn from our experiences.

According to Kolb, the learning styles are actually the product of two pairs of variables, or aspects that represent the "choices" that we make. As two lines – one vertical and one horizontal placed in a cross – each axis contains a "conflicting" mode at either end: the east-west axis is called the **processing continuum** and refers to how we approach a task, while the north-south axis is called the **perception continuum,** which describes how we think or feel about the task, i.e. our emotional response. The four learning styles are made up of two extrovert styles: **accommodating, diverging**, and two introvert styles: **converging, assimilating**.

The Accommodating (*doing and feeling*) learning style is 'hands-on', and relies on intuition rather than logic. Accommodators prefer to take a practical, experiential approach, and use other people's analysis of a situation or problem. **Divergers** (*feeling and watching*) are people who prefer to work in groups. They are emotional, artistic, and interested in people and culture, .

Convergers (*doing and thinking*) prefer technical tasks and are less concerned with people and interpersonal communication or issues. People with a converging learning style are best at finding practical uses for ideas and theories. They prefer instinct rather than logical analysis and prefer to carry out plans. **Assimilators** (*watching and thinking)* also prefer ideas, logic, and concepts to interpersonal interaction.

Understanding these learning styles helps both students and teachers to make a critical evaluation, of their learning process and develop appropriate learning opportunities. However, critics claim that Kolb's model is too simplistic. Mark Smith, (2001 http://www.infed.org/biblio/b-explrn.htm) for example, points out six problematic points with the model:

1. The model doesn't adequately address the process of reflection.
2. The four learning styles are extravagant.
3. It doesn't sufficiently address the fact of different cultural conditions and experiences.
4. The idea of stages/steps doesn't necessarily match reality.
5. It has only weak empirical evidence.
6. The relationship between learning processes and knowledge is more complex than Kolb draws it.

Like all simple explanations of complex behavior, Kolb's model is aesthetically pleasing but his idea that learning through experience happens in perfect loops between action and reflection is almost too good to be true. Reality is always more unpredictable, unsecure, distorted, and fragmented. (Smith, 2001 p.1) summarizes his critique in the following way:

"The idea of stages or steps does not sit well with the reality of thinking. There is a problem here – that of sequence. As Dewey (1933) has said in relation to reflection a number of processes can occur at once, stages can be jumped. This way of presenting things is rather too neat and is simplistic."

Given these problems we have to be careful how we use Kolb's vision of experiential learning, knowing that he looks more at the individual learning process, than the group and PBL aspects. As Tennant (1997. p. 92) points out, 'the model provides an excellent framework for planning teaching and learning activities and it can be usefully employed as a guide for understanding learning difficulties, vocational counselling, academic advising and so on.' This is in absolute contrast with Paulo Freire's uncompromising approach to education and his strong focus is upon informed, committed action. "No pedagogy which is truly liberating can remain distant from the oppressed by treating them as unfortunates and by presenting for their emulation models from among the oppressors. The oppressed must be their own example in the struggle for their redemption" (1970. p. 54).

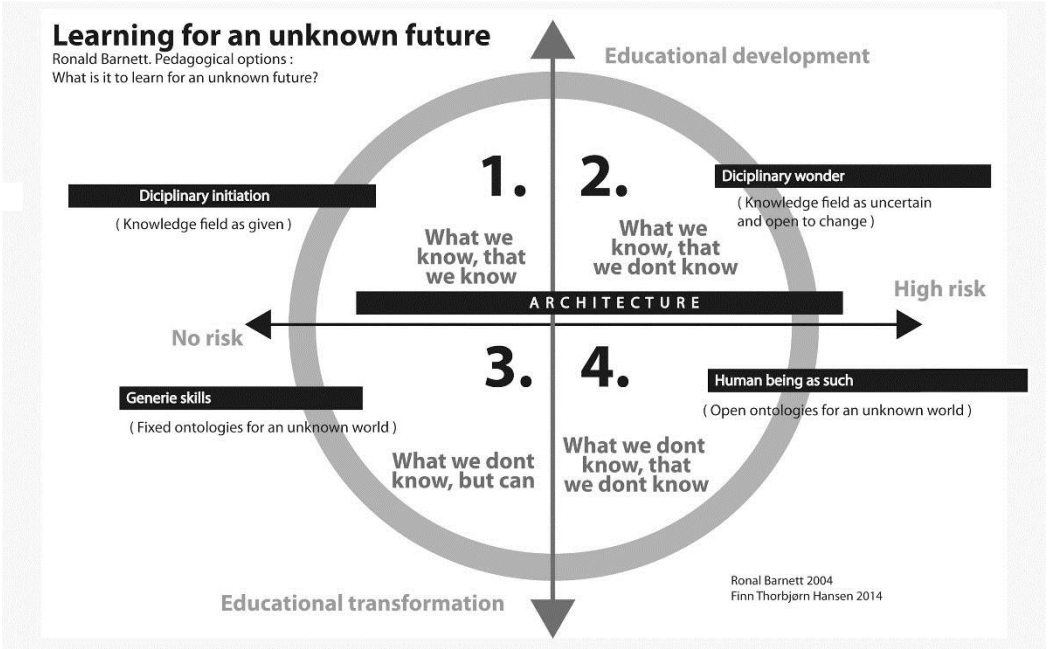
Freire is best known for his attack on what he called the "banking" concept of education, in which the student was viewed as an empty account to be filled by the teacher. He notes that "it transforms students into receiving objects. It attempts to control thinking and action, leads men and women to adjust to the world, and inhibits their creative power" (Freire, 1970, p. 77). We teachers and "oppressors" must also be willing to rethink our way of life and to examine our own role in the oppression if true liberation is to occur; "those who authentically commit themselves to the people must re-examine themselves constantly" (Freire, 1970, p. 60).

Few students who begin their college years today at AAU know anything about Freire and his revolutionary approach to pedagogy but they quickly grasp the social dynamics and advantages that group work gives, including the benefits of social and interdisciplinary learning and self-directed ownership of the learning process. They develop domain dependent skills, technical skills, generic skills, and thinking skills that "domain independent knowledge", such as problem solving techniques and learning strategies. Think of domain independent skills as, general skills that can fit as a problem-solving tool for any profession, in contrast to the more subject specific tools.

LEARNING FOR AN UNKNOWN FUTURE, AND METAPHORICAL DESCRIPTORS

So how do we approach our task of preparing students for the 'real world'? Ronald Barnett claims that we are passing from a complex world to a world based on super complexity; here

everything is uncertain, fluid, and unknown. In this world, according to Barnett, "the idea of skills, even generic skills, is a cul-de-sac." (Barnett, 2004, p. 257) It is a "dead end" to which we need a new approach. "A pedagogy for the uncertainty gains its ultimate achievement when the self is engaged. As we have seen, academics in their teaching role are bringing off this educational aim on a daily basis. Such a pedagogy is to be caught trough metaphorical descriptors." (Barnett, 2004, p. 257) Like Kolb's four learning styles, Barnett's four pedagogical challenges (see Figure X) are placed on two axes, one pole with "educational development" and "educational transformation" at either end and the second axis bounded by "no risk" and "high risk", which creates four boxes, each with a unique pedagogical challenges inside: 1. Disciplinary initiation 2. Disciplinary wonder 3. Generic skills 4. Human being as such.



1. Disciplinary initiation: Most higher education programmes, can be understood as offering some form of educational development. The student's growth, in understanding and advancement in skills are relatively risk-free thanks to the specification of aims and objectives and an encouragement to frame curricula according to the requirements of professional bodies. All of this programs, have the latent function of producing curricula that are lacking in risk. Uncertainties are kept to a minimum: this is educational logic at work.

2. Disciplinary wonder: To be fair, academics who take their teaching seriously have long found spaces to do creative and generous work, imaginatively constructing curricula that help to transform students. Where such imaginative teaching takes place, we may even envisage that students are placed in educational situations that are, in a sense, risky.

3. Generic skills: There is an emerging sense that such curricula are inadequate even if they are creative and bring about considerable educational development in students. The learning offered, even by Box 2 curricula, is designed to reproduce academic identities. It is out of such thinking that we have seen the development of a curricular discourse of 'skills', including 'generic skills'.The paradox of this pedagogy is that it claims to be able to bring students out of their academic domains into forms of being more adequate for a changing world. In short, we are confronted with the nonsensical belief that we can train human beings for uncertainty through a new kind of certainty in the curriculum.

4. Human being as such: The final quadrant offers the possibility and the challenge of a curriculum of high risk. This curriculum is aimed at the transformation of human beings - nothing less. At the same time, it strives to achieve this through pedagogies that are themselves characterized by uncertainty. A pedagogy for uncertainty cannot be (as in Box 3) technological in nature, in which ends and outcomes are tightly specified. A human flourishes here precisely because he/she is living effectively amid uncertainty. At the heart of such a curriculum is an exposure to dilemmas and uncertainties. These may spring from complexities within a field of knowledge (as in Box 2) but they will widen such that the human being him/herself is implicated. What we need are humans that are up for such a challenge.
In his search for a pedagogy to grapple with uncertainty, Barnett speaks of "metaphorical descriptors" as a language for risk, uncertainty, and transformation a tool for human beings that facilitate and creates a free mind and imagination.

> It might be a language of love, of becoming, of disturbance, or of inspiration. What is it for human beings to be encouraged, to be brought forth, out of themselves? Smiles, space, unease, frisson, humanity, empathy, care and engagement may be helpful as descriptors; but each pedagogical situation sets up its own educational challenges and the imagined possibilities will be sensitive to each setting (Barnett 2004).

With his four pedagogical options and challenges, Barnett goes beyond Kolb's model of the design process and learning styles and suggests four different pedagogical scenarios
Box 1: Disciplinary initiation is perhaps the "banking" model as criticized by Paulo Freire.
Box 2: An open pedagogical frame in which the teacher both lectures and teaches the subject. There is a common goal for both students and teachers to share the best interests of the profession.

Barnett calls it a position of "epistemic delight", created by the students as they learn their new profession and become able to use and enjoy the new insights to which the process has opened them. Box 3: Generic skills fit directly into the PBL problem based learning scenario, as we know from Aalborg and Roskilde. In contrast to this, Box 4 is the very open frame where the "risk" and the "epistemic delight" are companions on a wild voyage into the

unknown future. This is actually, what Barnett wants us to do, to "take a walk on the wild side".

CONCLUSION: DYNAMICS BETWEEN GROUP, THE INDIVIDUAL, AND THE ACADEMIC PBL SIMULATION OF THE REAL

So after an intensive semester together with the groups, where do we meet the consensus ghost? We meet it when the students fail to see the perspective and the horizontal line in their drawing, or when they agree on a design for a project based on a political compromise rather than a combination of aesthetics and function. In the beginning of this paper we asked four questions, which we now try to answer in text, images and with a special case report from one of the case groups. To reiterate, here are the four questions:

1) How can a PBL group-based learning environment based on a dialogical consensus ensure that everyone is working towards the same goal?
2) Does consensus architecture secure a necessary analysis and interpretation of the context, or does it create a grey consensus architecture based on compromises?
3) Does the PBL-method evoke a certain expression in space, form and materiality, but perhaps exclude other (possibly better) solutions?
4) Every group's work depends on the interplay between the personalities of the individuals and the group. How does this interplay affect the creative process?

"Shantytown" - Consensus for this group occurred after many long discussions. It took the form of a simple compromise based on three concepts: a submerged square, oblique beams as landscape markers, and the use of round windows as a maritime detail and architectural concept. What led the group's project to end chaos and disorder were the decisions that each house could be designed without any constraints, and that the oblique beams should be scattered randomly around the plot.

This project exposed a major part of the group member's design as primitive vernacular random design such as one experiences in slum areas, in the sense that the that there is no coherence between the houses and an absence of context and architectural design in the final housing. In short, it became an alien shantytown. This is a case in which architecture is the first victim of consensus. While consensus does not necessarily mean high quality, it does mean a compromise all can agree on, so design becomes a matter of creating compromises, similar to politics.

This kind of PBL group dynamic can go both ways. In this case there should have been an intervention by the supervisor. This kind of PBL group work is very fragile and needs a patient advisor who can work with all the individuals on their houses and not just talk *at* the

group members. This case demonstrates why seven first semester students cannot be lumped together and left to their own devices without heavy supervision.

This case also shows that even a bad consensus based design concept cannot damage or obscure the work of two particularly skilled group members, who were craftsmen and created both physical as well as digital models of high quality. The drawings of the work they completed will aid them when they apply for jobs. In conclusion, the skilled students did excellent work while the weak students failed, and the PBL group work and supervision failed to raise the weak students' level of competence and ability.

"The orangery" did not come easily as a concept but through a long series of design loops the group created a disciplined glass house that resembled a cathedral with a monastery off to one side. The concept was simple - a large rectangular orangery with gables placed east to west and seven small houses on the north side, all of which had private access from a boardwalk that also served as a public entrance to the actual orangery. This project actually proves the advantages of the PBL group work when the work is carefully executed with discipline and commitment from all group members. Here consensus created a synthesis of form and function based on a meticulous study of the function and history of winter gardens, orangeries and greenhouses. Group members carried out detailed interviews with professional botanists and gardeners and gave users a high profile and priority. One could argue that the PBL based group work in this case lifted all members to a higher level and left no weak students behind. The supervisor supported the strong project concept and ensured that all the 2D and 3D sketches and models where carefully constructed in terms of scale and materials.

"Hexagon square" was a group of only three members who had a very strong concept in terms of materials and function and three individual designs based on the users' demand and profession. The project was so strong in concept design, technical drawings and 3D visualization that it exceeded the requirements of the project module and semester project description. Because they were so small a group, the members decided to work extra hours and sometimes labored around the clock because they were determined that their project would be the best. There was no aesthetic compromise and the group was quick to make conceptual decisions. The members talked little and had few group discussions but put a lot of work into drawing models and 3D sketches. They produced the same amount of work as groups with seven members because the bigger groups were often slow to make decisions and actually get things done.

The group began as a group of six who could not agree on anything and spent the entire first part of the project on discussions about which way they should go. Finally the supervisor intervened and split the group into two. This group did well but the second small group of three did poorly because two members became ill; they eventually passed the exam with the lowest passing score.

"Seven pyramid stumps" In this case the group agreed on a strong concept in which all seven building units had exactly the same truncated pyramid form. The smallest section of each pyramid pointed to the center square with a spiral staircase that went to a circular roof, which served as a platform with a view of the whole harbor. However, all users - botanists, photographers, and authors - needed to fit into the same structure, which did not work. Each pyramid was a narrow eight-meter high triangular form closed in on all sides save the wide end, which had a large window that was covered with several layers of blinds placed in asymmetric diagonal lines. These lines created a flexible structure that could dampen the sun's light.

The very expressive, partly transparent structure that was based more on a fascination of form than function, but it created an interesting random play of shadow and light. The idea was to mimic the many layers of branches in a forest and the group did a great deal of work sketching, doing models and testing shadows and the interplay between light and dark in complex structures with these abstract representations of branches.

Because the group's form concept was, so strong it was impossible for the project to satisfy the users' needs and desires. However, this problem was not clear to the group before they took their exam and had to explain their project. It was then that they realized that for the project to have a meaning and content, they had to run the design process again keeping the users in mind while also redirecting and redeveloping the architectural and aesthetic expression of the project. The group explained their process in the report below with a storyboard that illustrates the workflow.

WEAKNESS AND ADVANTAGES THE MANY FACES OF CONSENSUS

Looking at these four cases, we can say that a successful PBL pedagogy and group system can lift weak students up to a higher level with the help of strong group members. Seven should be the maximum number of members in any one group and it is up to the group to decide how long to spend on discussions and meetings. However, first semester students have no experience. When groups are small, the project is easier to manage in terms of meetings and discussions, the amount of work per person increases, and weak students cannot hide behind strong students as they can in large groups. Students quickly realize that it is bad for a group to have members they cant trust, there is no demand for the weak or immature students they quickly end up in "weak groups" together in later semesters.

Consensus architecture seems to have many faces as "form for form's sake" in the case of the "seven pyramid stumps" group. Here the group agreed on a strong concept - so strong that it

overruled the needs of the users and became a form for form's sake and a project in which the user was secondary.

"The orangery" was a strong poetic concept with a glass cathedral attached to a monastery in which resided seven botanists in seven small houses. This is the ultimate consequence of a precise design concept; one dwelling totally dominated by function and the user in a giant glass house. A dream garden that survives all season's rages - storms, snow, sun, and rain. Here the face of consensus aesthetics is no compromise but a utopian statement; form function and poetics created unity and an almost metaphysical statement.

In contrast, the "Shantytown" became an example of how the real world works outside academic simulation - this is the dark side of consensus. Architecture and urban design require a complex negotiation between many stakeholders and interests and we must not underestimate the strong political and economic forces that architecture must relate to, and be able to survive, to create something unique for the future and our children. This PBL group work is just a small simulation of the real, and in the Shantytown project it became clear that there is a big difference between the aesthetics of a political compromise and the quality of an individual's work.

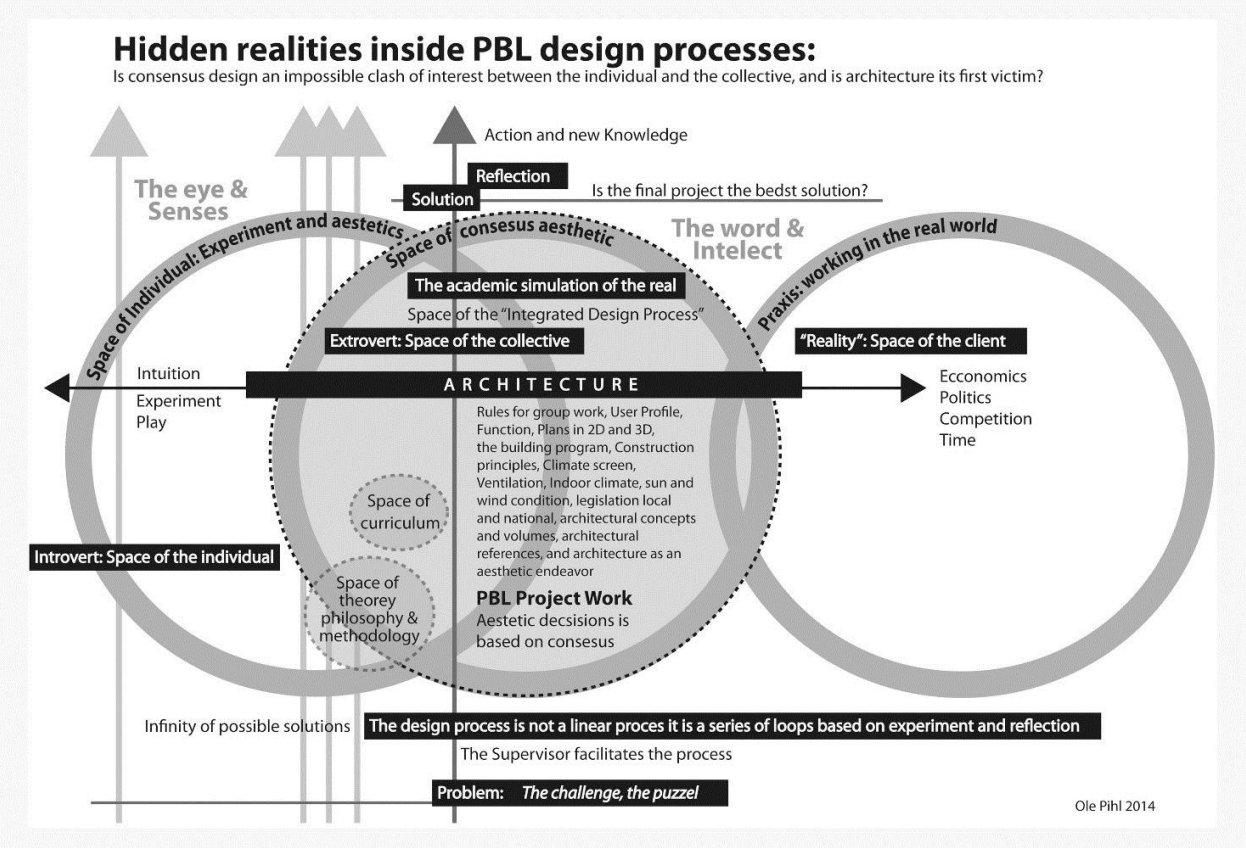
Students must agree with their supervisor/mentor that supervision should be both individual and collective. Together they must work with drawings and physical models and share the creative process. Each experiment has to be followed by reflection.
Everyone in the group should also help to share the experience of the individual loops, work toward less talk and more action, and produce a constant flow of drawings, images and models.

We should not underestimate how important it is to explain and demonstrate to new students these examples of the possible consequences of group work and PBL. I will use this paper and the four cases as an introduction for new first semester students.
The ghost of consensus takes the shape of the group it appears in. Consensus is the merciless mirror that reflects our weaknesses and fears as well as our strong sides.

To take a more general view, we have looked at Kolb and Barnett and the two ideals of what a university should represent. But we have also investigated the more individual aspects of the design process explained through Bachelard's "The Poetics of Space" that actually exemplify what Barnett is asking for when he speaks of "metaphorical descriptors", as a new open emancipatory tool and language.

In the architectural design process it is clearly that working with images and both 2D and 3D models it is evident that a metaphorical language can, will and must be developed. However, we must remember that behind the PBL process you can still hear Paulo Freire original voice

telling us that the goal of education is to lead men and women to adjust to the world, and to release their creative power. Thanks to Kolb and his four learning styles, we can also quickly identify some general conflicting personalities and character types that meet and conflict within PBL groups and create a differentiation within the curriculum, and the actual learning process between students and teachers. In plain words, we must and can meet the students where they are. If we don't it is just "the banking method" and who needs that?



This schema displays "the academic simulation of the real", which is a world of the written and spoken word. There is little space for the visual arts here, and this academic simulation, this extrovert space of the collective has even within itself special hermetic airtight pockets and worlds within worlds as the space of curriculum and of philosophy and theory. Nevertheless, the simulation creates the illusion that it can actually prepare you for an unknown future. In short, as Ronald Barnett stated, "We are confronted in this idea of education with the nonsense belief that we can generate human being for uncertainty through a new kind of certainty in the curriculum".

It must be a warning, like "watch out for the unpredictable future because you do not know which direction it comes from. Prepare for anything."

Assisting students: Tine Brandstrup, Kathrine Virenfeldt Vand, Christoffer Thor Paulsen, Martin Juel Jensen, Mathilde Marie Severinsen, Maria Vittrup Thomsen, Malene Højvælde Nielsen.

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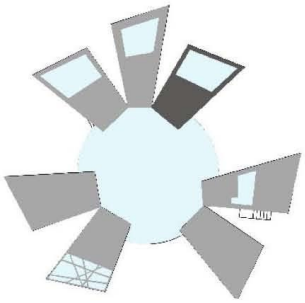


Introduction to the semester theme
First semester final project main theme was "Building and Light". With focus on how public utility integrated into the maritime harbor at the, as an extension of the town - and thereby connect the city and harbor. Furthermore, it was a requirement that had to work in timber structures, as well as to each harbor house had a limitation in scale as a minimal house on max. 60m2. based on this framework, we have created an integrated port colony of seven minimal housing. Each harbor house represents a profile with specific requirements - and individual needs for a port housing. This article does not focus on the actual exam project, but on how the group worked, worked together and utilized each other's skills. The group created a common idiom, which ended up being a distinctive concept. The project where focused on the design and organization of the port houses, but this article focuses on the conceptual reconstruction.

How we experienced the creative processes within the problem-based learning system.
The group used a long time to start the design process. We had many very different ideas for what types of architecture that we could work with as sources of inspiration. In addition, we quickly agreed to gather good ideas through a frame on three themes. It was, cubic, prismatic and organic, and we ended up with a decision for the concept based on a combination of cubic and prismatic design.
We concluded to work with the cubic and prismatic forms. These where used for the preparation of two development plans, each consisting of seven individual houses.

Each house was based on selected sources of inspiration, but it was clear to the group that this was not enough to get the optimal interaction between the houses. It was in this part of the process that the group decided to give priority to a strong prismatic concept to the individually houses a concept that overruled the individual aspects of the house and the user.

The group then made a precise conceptual framework for how the houses should look and how the interaction between them would work. The group had many additional factors that were important for creating an optimal port colony combined with public space.
With these elements as stairway platform, gallery, a system of pedestrian paths from the park, the common urban solution was the focus so after much discussion the individual hoses become uniform and alike based on almost same design and size.

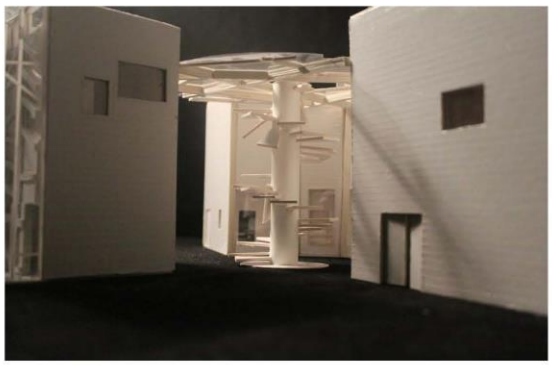
Each team member made suggestions for how this form concept should look like. This was pretty far along in the design process, so the group was here began to converge in terms of design. There was not total agreement, but we began to be realized what kind of style the group leaned towards. The individual proposals was therefore not so different from each other at the beginning of the period. However, there was still a need for a vote to conclude which form concept that, should be further developed.
The group agreed that there should be room for individuality. Accommodation and partly facade was therefore up to the individual group member to design. The facade, however, had still some limits to take into account; it would include a specifically designed pattern on the shutters, which should be attached to horizontal larch tree boards, and the harbor houses with artistic residents should have a showcase towards the center of the development plan.

At last we managed to get all the items into a synthesis, creating a strong concept. A concept who can easily afford to have rotated the individual houses, as this coherent idiom creates a red thread. The added elements for public spaces may still be, but must be in line with the houses also rotated and changed.

After graduating, we developed the concept and challenging the very stringent form concept by rotating the houses differently, so they impaired persons different, but related to the same volumes and shapes.

Group b362 Christoffer Thor Paulsen, Kathrine Water, Mathilde Marie Severinsen, Martin Juul Jensen, Malene Højvælde Nielsen, Maria Vittrup Thomsen.

Fig 1



Public accommodations
Before the exam (Fig. 1) was a spiral staircase leading up to the platform, which was available to the public.

After graduating, the site plan restructured, which involved several public spaces in the form of new types of stairs (Fig. 2 and Fig. 3)

Fig 2

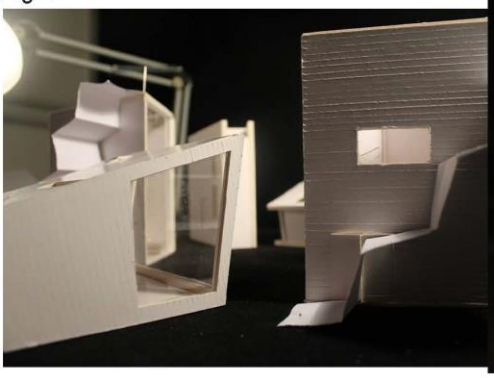
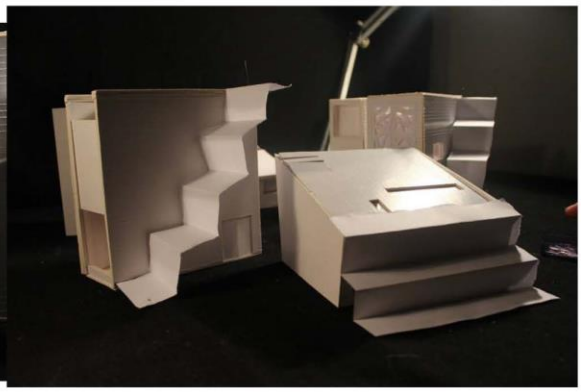
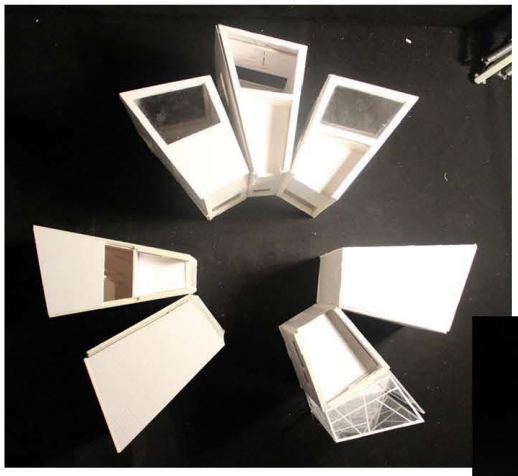


Fig 3

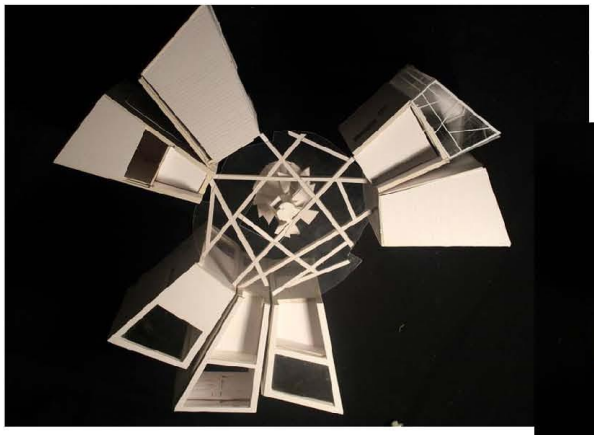


Before

After



Site model with only the individual houses



Model wiew with both houses and platform