1:1 scale building workshops as teaching tools

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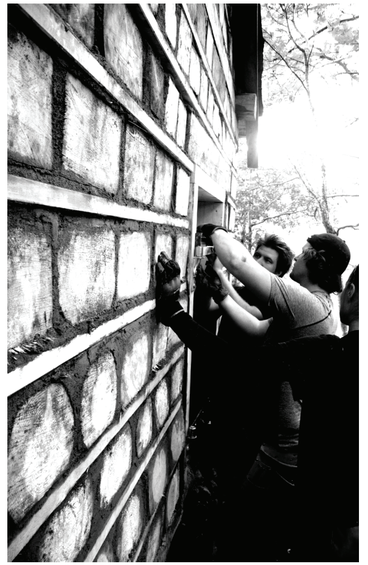
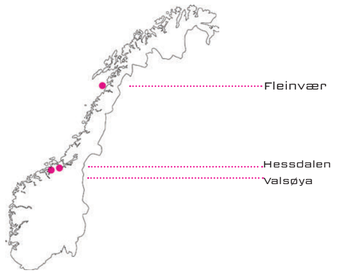
During the las decade, 1:1 scale building workshops became clearly very popular. Something that 25 years ago was a completely unknown genre. While on the one hand we are going towards a digital world, where we draw virtual models with computers without the need of drawing all day long on the paper, on the other hand the popularity of 1:1 scale building workshops shows that we cannot give up the use of our "hands and body" in design.
Somehow, it looks like we need to go back to the origin. If we cannot draw physically our buildings anymore, we directly go to build them. What I am writing here is just an image – of course not all architects are building with their hands their projects as in 1:1 scale building workshops. However, in my opinion, there is something very serious behind this new fashion.
If we agree that architecture highlights social characteristics, we should investigate better this growing wave in the profession.
This paper presents a deep analysis of three 1:1 scale building workshops which were part of a one-semester long, master-level university course at the Norwegian University of Science and Technology.
The aim is to investigate different aspects (the initial questions are reported in the appendix) of 1:1 scale building workshops in order to deepen the understanding of these activities and their connections with the education of architecture and more in general with trends in current debate in architecture. Instead of focusing on just one topic, the investigation touches several aspects because their intercorrelations are so strong that it is hard (and probably reductive) to detach one from the others.
By the end of the paper, my personal goal is also to define and frame those discussions which seem the most interesting for further investigation.
This analysis of the 1:1 scale building workshops is based on three case studies, that is three workshops carried out in the Fall 2016, where I participated as a tutor. For the sake of this research, a mixed methodology which includes different activities and interactions with the students, was used.
In the first workshop, together with the other teachers, I was a member of the team that was building the artefact. Gradually, in the following two workshops, the teaching team moved further away from the students, giving them the chance to become more independent and act alone. This change in the role of the teachers was a planned and conscious act based on a pedagogical strategy. Furthermore, this gave me the opportunity to adopt different points of view during my research, switching from being a full participant in the workshop to be someone who could observe through the guidance of the students' activities.

The paper is articulated in five sections. In the Background, the nature of 1:1 scale building workshops is presented specifically in the context of the activities carried out at NTNU, that has a long tradition in this pedagogical tool. The Introduction of the cases (the three workshops) follows, where a description of the aims, settings, and activities of the three projects are given. The section called Finding from the cases reports the main observations on different aspects of the three workshops, while in the Discussions these findings are analysed in a wider perspective. The Conclusion section summarizes the study and highlights the most interesting outcomes that are worth of further investigation.
Additional material, framing this research and setting it in a more personal perspective, which could not be presented in the paper for the sake of brevity, is included as attachment in the Appendix.



Two on-site building workshops and one prefabricated building workshop are included in this study.
These current examples of 1:1 scale workshops were organized within the master-level course Design in Context, offered by the Faculty of Architecture and Design of NTNU. Both students from Norway and international students attended the course.
The course coordinator was Pasi Aalto, Assistant Professor at the Department of Architectur and Technology at NTNU.
Sami Rintala, Professor at the Department of Architecture and Planning, founder of the Rintala Eggertsson Architects was the other main tutor of the workshops.
Kata Palicz, DLA student of The Doctoral School of Architecture at the Faculty of Architecture of the Budapest University of Technology and Economics at the Public Building Design Department took part in the course as tutor.

"The course is a dynamic design & build course that explores the social, pragmatic and contextual framework for making permanent small scale buildings as a collaborative exercise. The participants will learn to consider the framework of the project and develop their skills in moving from design projects to making projects happen. This years course will evolve around 1-3 design and build workshops. The first workshop will be a firehouse in Valsøya, Norway using an experimental historical building methods, namely wood and clay masonry and hopefully turf-wall based on 1700s Finnish saunas for poor peasants. "|course description by Pasi Aalto|



The first workshop took place in Valsøya, Kjøløya. Valsøyfjord is part of the Halsa municipality in Møre og Romsdal county, Norway. It is part of the Nordmøre region.

During the first workshop, we built with the students a Finnish smoke sauna with a traditional Norwegian building technique, though originally the technique was not used for saunas.

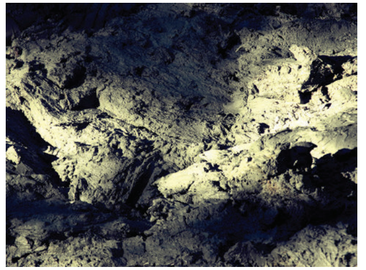
The tutors of the workshop were Pasi Aalto, Sami Rintala and Kata Palicz.
Other instructors were Jon Godal and Steinar Moldal.
Jon Bojer Godal is an prominent expert in traditional Norwegian wooden buildings and boats. In 2015 he got The Royal Norwegian Order of Saint Olav for his outstanding efforts within traditional crafts. He wrote several books about the crafts of old wooden structures. Nowadays he is engaged with the Norwegian Geitbåtmuseum Nordmøre in Valsøyfjord, Halsa.
Steinar Moldal is the leader of the Hjerleid School and Craft Centre based at Hjerleid in Dovre, in the county of Oppland. There he teaches several traditional crafts mainly related with wood.

The goal of the project was to realize a small scale building with this old Norwegian building technique ("kubbeveggteknikken") that can work as a test building to further research the feature and the performance of this technique. The "newest" building realized with this method was built in 1954, but it seems that lately more and more people got interested about this technique. (1)

The aim of the workshop from an educational perspective was instead to introduce the students to the use of tools for wooden constructions and to make them sensing the manual labour at the building site.
In this workshop the students didn't need to design before they started to build the building. They only got a very rough sketch of the building which contained very few information.
Instead the first step of the workshop was to directly start to work on the site.
In this way, they only could focus on experiencing the manual labour. Somehow, they had the role of the workman, though it is probably inappropriate to consider it as the classical role of the workman because the students had no former knowledge about the building technique as well as they didn't have any working drawing.

In Valsøya the students lived in their own tents in a camping nearby the fjord. They made their daily meals outdoor on the fire, sometimes they even tried to get the food to be prepared themselves. It should be said that catching the food was not a successful activity, and that the weather conditions were not good either. During the workshop an almost continuous rain was falling on the groups' heads and this made the construction work even heavier.

The materials used for the construction came all from the area and everything was processed by hand. The timber material available was trunks, approximately 4 m long, still covered with the bark, brought from two different places. For the frame - one on the bottom of the building as main structure that would have supported the walls of the building, another one on the top of the wall structure as a "base" for the roof – larch wood was used, while the wooden cubes were obtained by spruce.



The students needed to peel and cut the trunks in 50 cm long pieces. The clay was made in situ with the use of sand, fjord water and marine clay, though originally in this technique clay with water from the glacier time, taken from the soil, was used. The majority of the stones used were selected and carried from the fjord shore next to the building site, only the especially big and flat pieces came from a bit further, from a local quarry.

The building technique (cordwood building) was not completely clear at the beginning of the workshop. It got understood day by day during the process. It also seems that this technique is not clearly understood in general. It was used in Norway mostly for barns in the inland area during the last centuries, but there are very few examples (mostly in the Oppdal area) that still remain. This was also a reason for this workshop, whose aim was to make a test-building for further research on the technique. One of the hypothesis is that this technique was used for recycling old timber material from rotten log houses. It is clear that it was an easy and cheap way to build these barn buildings, but some people believe that it could also give some advantages because of its climatic behaviour.

The technology - cordwood building – called „kubbeveggteknikken" in Norwegian, is based on a wall constructed with 50 cm long wooden blocks that are mortared together with clay. The wooden blocks are used as "bricks", though they are not in bond, but they are just put on the top of each other. In between the wooden blocks, and on the top of them, a layer of clay approximately 2cm high is placed. On the top of each line of wooden blocks come two parallel wooden planks, placed along the inside and outside edge of the wall, which are screwed to the wooden blocks every second block. Then, a layer of 2 cm clay is placed on the top of the planks, and a new layer of wooden blocks, as previously described, can be placed again. This process is repeated all the way to the top of the building.

The work started with making two sites for the construction process. One is a preparatory site, the other is the actual site. The students needed to clean them and because of the rain to make a very large tent above the working place.

Like this for several days the students worked in two groups, though the groups were not fixed and anyone could change his or her task at any time.

By the end of the first day, Group 1 cleaned the site, made the rock foundation and set the contour of the building. Group 2 peeled and cut the logs, started to carry wooden blocks to the site and they made a half ready frame (for the bottom of the walls).

During the second day, Group 1 at the building site started to build the oven with Sami. The oven was made by stones collected from around the site, mostly carried from the fjord. (more about the process of building the oven described in the part "Findings on cases") Group 2 almost finished the frame.

On the third day, Group 1 finished the oven with Sami, while Pasi finished the wooden pillars for the sauna. In the meanwhile, Group 2 finished the first frame (that is the foundation for the walls), and carried it down to the building site, where

it got on its place. Group 1 started to fill up the frame with moss and clay. During the afternoon, most of the group visited the boat museum and met for the first time with Jon Godal. This was the first opportunity to have a discussion about the building technique that was getting used during the workshop.

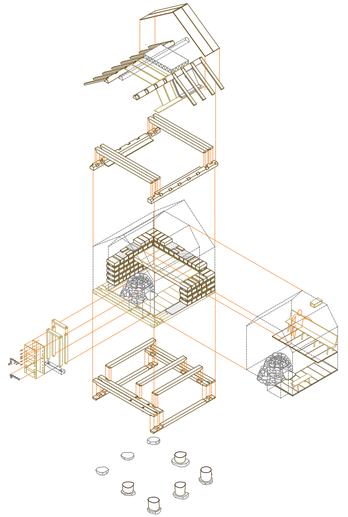
On the fourth day, Group 1 started to put in place the wooden blocks with the clay. At that time, the only known feature of the building technique was that blocks should have not been put in bonds, just on the top of each other. This made many people sceptical about the structure to such an extent that some later said that they felt frustrated because of the lack of understanding of the technique. After the group was ready with the first line of wooden blocks with the clay in-between, Steinar came and showed what would have kept together the building: planks would have been used on the top of every row and they would have been nail to every second wooden block.
On half way of the whole workshop people started to understand what they were building and how it works. This brought back the motivation, which was falling a lot before.
By the end of the fourth day, three layers of blocks were completed. It was important to keep this number of layers to be built for every day in order to get the layers subside and dry together in the right way (though the drying process was complicated by the continuous rain) before proceeding with the construction.
The first layer was made out of round sectioned blocks, but then later the group realized that because of two types of raw wooden materials, two different type of blocks (round and square shape section) were being manufactured, so it was decided to mix them random (for aesthetic and design reason). Later on, when Steinar realized this, he told not to proceed further with this approach, because the different sectioned pieces came from different wood (they come from different place, they are not the same dry), so they could not be in the same line otherwise one line could have not subsided together.
On the fifth day, the construction speed, that is to make 3 new layers of blocks with the clay and planks, was kept. It was still raining all day long, and it was really hard to imagine that anything could dry at the building site.
Since the walls were getting higher and higher, on the sixth day it was necessary to realize scaffoldings around the walls. In the meanwhile, Pasi went to prepare the door of the sauna in a workshop.
Other than the scaffolding, only two more layers were realized. At this point shortage of building material started (there was hardly material to realize the scaffolding), and it was therefore not possible to finish the wall's layers using just one type of block. Because it was necessary to keep the speed of the construction, that day was full with improvisation. A good exercise for dealing with in-situ problems on the site, where one needs to solve the unpredictable situations with what is given there.

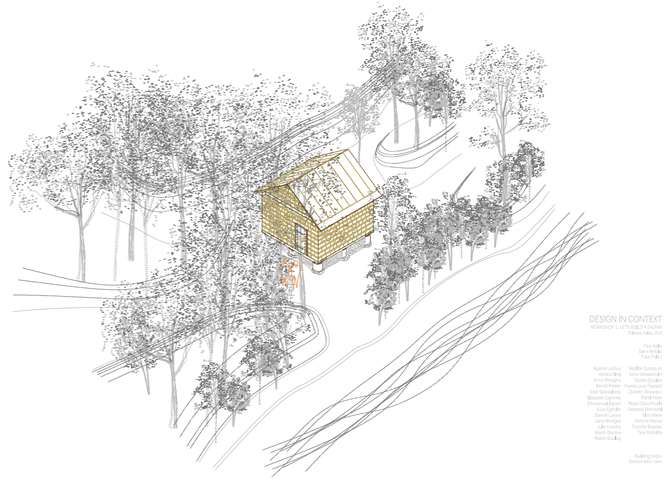
During the seventh day, the top frame was in place and the construction of the roof started. At the same time, some people were working with the door, some with the inside elements (bench), and some started to clean the facade. At this time everyone was working on the site of the sauna.

Because of the bad weather conditions and because literally everyone was sick after some days, it

was decided that the eighths day would have been the last one. It was thus necessary to finish everything, the roof, the door, the inside part with the furniture, and to clean up: It was a very long day with a lot of job. Finishing the door was a beautiful task, and it was possible to see how to make a clinch. At the end of the day (at that point it was already dark) the fire was made, but it was not possible to try out the sauna since it would have required at least 6 hours of heating up.

Everyone was happy that the job was finished and that it was possible to see the house standing eventually. Still, compared to the original intentions, it was not possible to make the changing room, the path to the sauna and the path from the sauna to the fjord, but at that last moment no one remembered those missing parts.





The second workshop of the semester took place in North-Norway above the Arctic Circle, in a group of islands called Fleinvær, located in Gildeskål, Nordland, Norway.

One of the islands is called Sørvær. There, some years ago, the owner, composer Håvard Lund dreamt his project called Fordypningsrommet Fleinvær. The project's aim is to create a calm environment for artists' works.
There are nine houses, where four is meant for sleep, where one is meant to inspire on its column, one is a kitchen house, one is a studio house, one is a sauna on a pier, and one is meant for cleaning yourself. /Håvard Lund's description of the project/

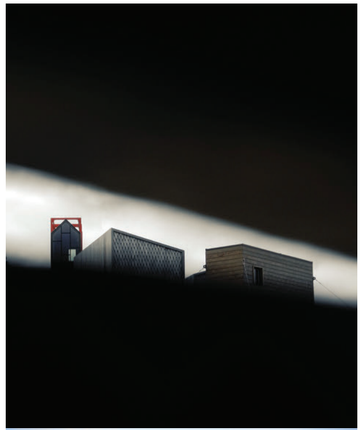
The architectural part of the project started with some workshops organized by Sami Rintala and later together with Pasi Aalto. The official designers of the projects are TYINN architects and Rintala Eggertsson Architects.
Still it should be added here that Andrew Devine was the architect who followed the project for two years with his presence at the place and with his work on the buildings as a craftsman.

During the workshop the tutors were Sami Rintala, Pasi Aalto and Kata Palicz. From Estonia joined Hannes Praks, the Head of the Interior Architecture Faculty of the Estonian Academy of Arts.
Later two other teachers joined to visit the workshop from Estonia. Aet Ader and Karin Tõugu are both owner of the Estonian architect office, b210 studio and they also teach in the Interior Architecture Faculty of the Estonian Academy of Arts.

The aim of the workshop was to finish the project Fordypningsrommet Fleinvær. The first task for the students was to understand what finishing can mean in the given situation. The client didn't have particular wishes and this gave the opportunity to the students to act according to their knowledge and feelings. From a pelagical perspective the main task for the students was to learn how to act humble, even if it means almost no construction. It seems maybe simple but in the given context it was a challenge for the students to give up their big ambitions towards building something "cool".

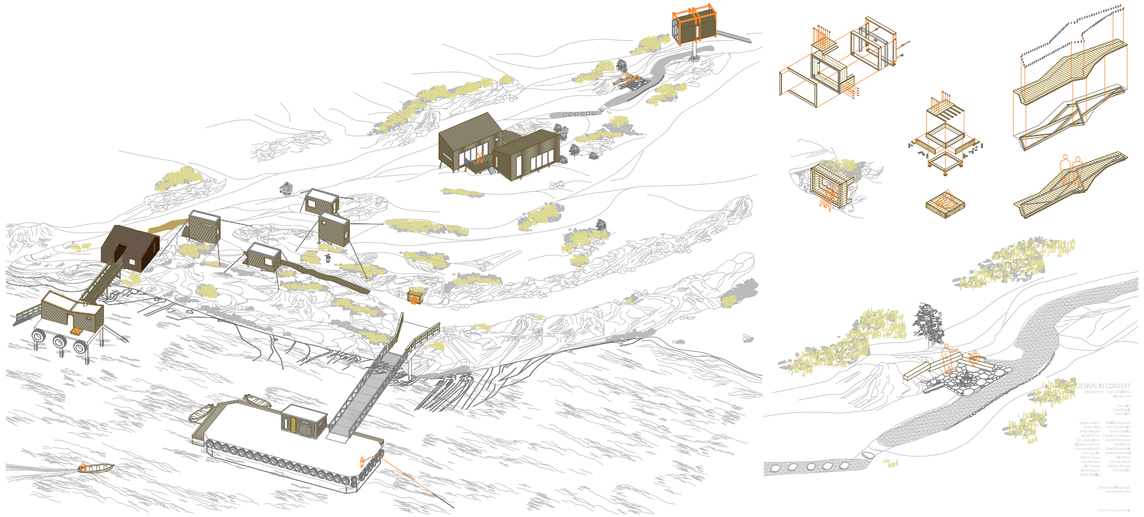
All the materials used during the workshops were leftover of the building process of the project. The aim was not only to use material from leftover but also to use as much material as possible in order not to leave waste on the island, because to displace unused building material would have been very expensive and not very sustainable (anything would have been needed to be brought away with boats).

During this second workshop the students were given the possibility to design first what they would like to build in the given context. There they had the opportunity to take both the role of the architect and the role of the workman (craftsman). Therefore, they could experience the relationship between the manual labour and the conception. Moreover, there again, the classical design methodology, where one designs both the building and the process itself, with all the steps and needs, was not ad-

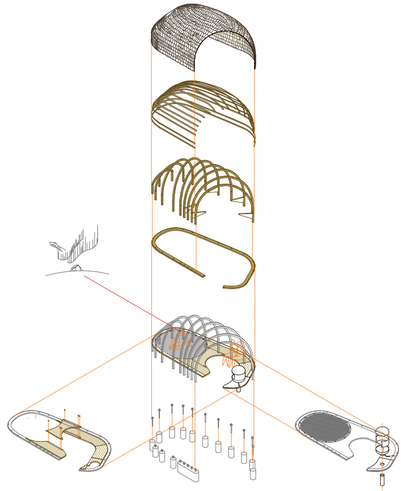


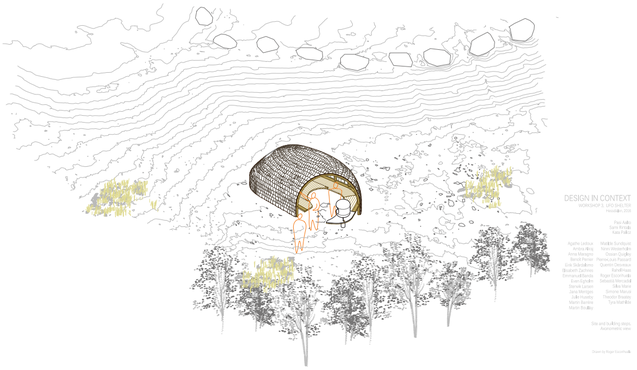
opted. In this case, the students only developed sketchy concepts and drawings about what they wanted to build on the side. After that, they designed and built simultaneously right at the building site.

On the first day, all students needed to draw individually an idea about what type of intervention they could imagine on the site. They presented their drawings and thoughts to the tutors and to the whole group. After the tutors gave their comments on the ideas and having a common discussion, the students formulated three groups among themselves. These groups continued the development of three different projects.
Group 1 made a fire place for cooking and community evenings at the top of the site. Group 2 built a footbridge as a path in order to save the original vegetation (mostly juniper) of the site and prevent that everything just becomes muddy. Group 3 made a bench close to the harbour, where one can wait for the boat or share it with a couple of people to talk in windless box. Later some other small projects appeared, such as stairs to facilitate the walk or a second bench.
For this second workshop in Fleinvaer Hannes Praks joined the group, not only to observe the method of the workshop and to discuss teaching methods with us, but also to offer input and assistance.
With Hannes the teachers had many discussions on how to give the students a better, updated education, that reflects more on the new challenges of our world. One of the result of these discussions was to give a different (still very much connected to the project) task to the students. Because of this the students could spend some hours alone in separate islands around. (more writing on this in the discussion part)



During the third workshop the students designed and built an UFO observation shelter for Statskog SF which is a State-owned Enterprise (SOE) that manages public lands in Norway. The artefact will be placed in Hessdalen in Holtålen municipality in Sør-Trøndelag county, Norway.
Students developed and designed a shelter in order to observe unexplained nocturnal lights in Hessdalen Valley.
The artefact was designed and prefabricated in the studio-rooms and workshop-lab at NTNU, next spring it is going to be moved on the site.
In this project the students were independent from the teachers, they had to manage alone the entire process from planning to the construction. This meant that they kept the contact with the client, they needed to deel with schedules, budgets, etc.





For this study, I used self-experience (observation, participation), common conversations with the students and other teachers, individual conversations, questionnaires for the students, prepared interviews, own research on the field mainly through different literatures.

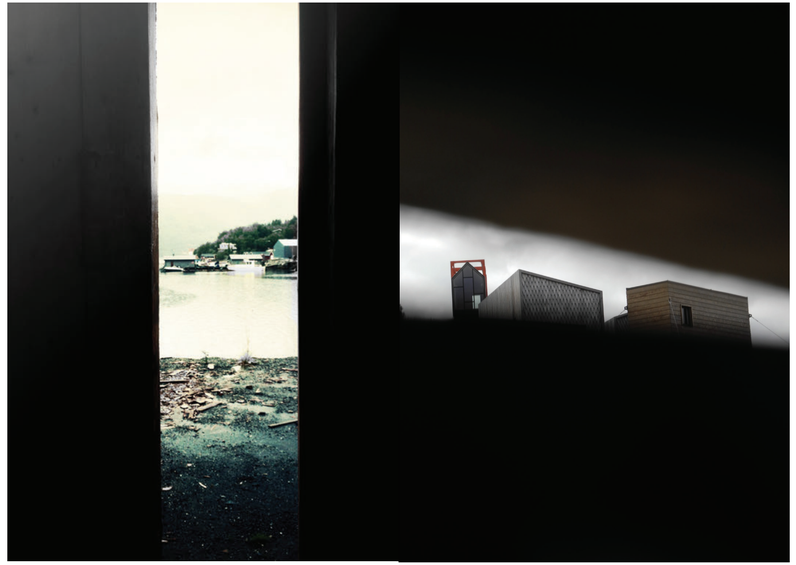
I was continuously observing and questioning the students during the workshops. In the first workshop, I tried to position myself rather being part of their group as a participant then slowly by slowly I made steps further in order to take the position of an observer. By the second workshop I reached to have a certain distance from the students and I was able to observe from outside.

During the second workshop, together with Hannes Praks we gave to the students a task apparently different from the building project, actually very much connected to it. Through the observation of the students' actions and reactions in this task, it was possible to reach a particular understanding of the students' abilities and personalities. After the second workshop, I gave questionnaires to the students to fill out. These questionnaires included direct questions, open questions and some drawing „assignments".
I made 56 questions to the students and 2 drawing assignments together with the first two questionnaires. We had 24 students which means that I gave away 48 questionnaires form which I got back 44.

I followed the third project from a more distanced position. I was not with the students every day, but I had individual conversations with them several times and I checked the building process from time to time though I tried never really commenting/tutoring their project.

After the final review of the course I organized individual interviews with the students. These were semi-structured interviews coupled again with four drawing "assignments". One interview took from 2 to 5 hours but the average length of the interviews was about 2,5 hours.
During these individual interviews, I met with 3 types of personalities. One who let me to drive the conversation and always just strictly answered to my questions. Another type who was following my questions, but started to ask back to make the question more precise, to be sure that we had a common understanding of the question. This type of personality also opened up to new topics, but it was always ready to go back to my "question-lines". The third type of personality (the most difficult to deal with) tried to take the conversation in his or her hand, and sometimes gave different answers far from my question just to be able to tell his or her own stories. The most fruitful conversations came out with the people from the second group.

When I made questionnaires or interviews with the students I always add some questions to them for which they needed to answer through drawings. I believe that since the main communicating language for architects is drawing this is one of the best tool to get honest answers for the questions.
Also for myself (being an architect) is much easier to understand, (decode)the answers given by the hand.



It was a very interesting experience to start to build a building without former planning or without having a detailed drawing. When Group 1 started to clean the site with only knowing the overall dimensions of the building, they didn't think that everything could evolve so naturally. The fact that they were building directly on the site, with the possibility to sense everything with their body, made the students very confident in making decisions. They were kinds of experiencing that the site was deciding for them (more about this topic will be presented in the discussion section).

Building the oven was one of the best parts of the workshop according to the philosophy "design by making". It was a very good example to highlight how much it is important to understand the material itself to be able to design.

The first idea the students had in their mind about the oven didn't work well with the construction. As a first try, after making the base of the stone and starting the oven's walls, several wooden cubes were placed in order to make a centre/frame for a vault. From the given stones – those that were able to be collected from the site and from the fjord shore – it was not possible to make the vault. Therefore, the students decided to close the top of the opening of the oven with two huge flat stones.

The experience that the stone arch would have fallen down after the frame would have been removed was a very good experience for the students. Even if they were not able to make the arch from the given round shape stones they could learn a lot from their "failure".

Another interesting thing was the selection of the stones. Because of the direct heat the stones would get from the fire, it was not possible to use stones with too much iron deposited in their surfaces. These types would have cracked while heating. The construction needed stones with different sizes and shapes, depending on the position of the stone (if it would have placed in the wall or on the top, where there was need of the smallest and most rounded pieces).
When one needs to make such an assortment the act of picking/collecting the stones cannot become an automatic movement. It becomes natural to touch, weight, check, look, and sense in all sense the material, what gives a good understanding of that material.

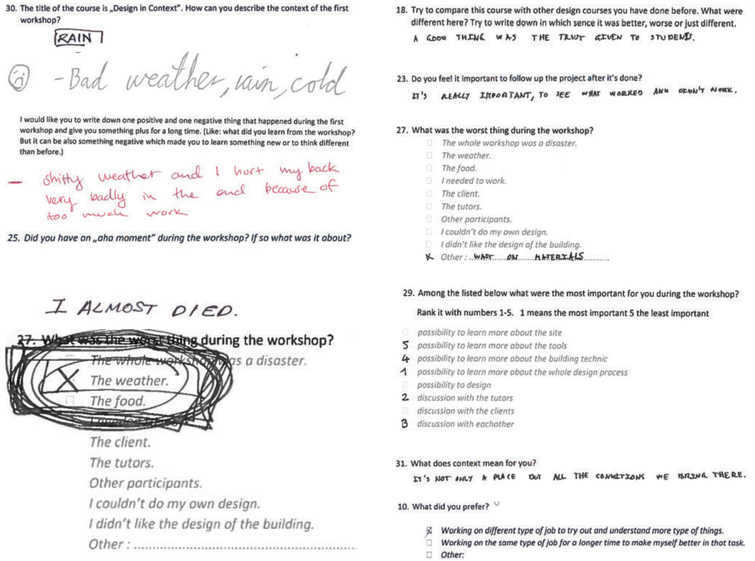
The fact that there were not either detailed drawings about the building itself nor much information about the way of constructing it, place the students rather in a worker's position, since they mostly needed to follow one step instructions without much understanding about the further steps.
I observed two main types of personalities among the students in this position. One was able to take the role of the worker who is just following instructions without a wide understanding of the whole, while the others were not able to give up their architect's role. Those second type of students were more sceptical about everything they had not full understanding about. They became unmotivated when they didn't understand what they were doing. (see more about this topic in the discussion)

The building technique that was used during the first workshop was enough odd and surprising to bring naturally discussions about building physics which is usually not among the most preferred subjects for the architects. The 1:1 scale on site workshop seems a much more efficient platform for teaching than the classical classroom lectures. (see more about this in the discussion)

missing topics:

The Valsöya workshop could be also a very good opportunity to learn about building physics.

The students reported that the biggest impact on their personal development was the awarness of the effort that a builder needs to put during the building process.



30. The title of the course is „Design in Context". How can you describe the context of the first workshop?

RAIN

-Bad weather, rain, cold

I would like you to write down one positive and one negative thing that happened during the first workshop and give you something plus for a long time. (Like: what did you learn from the workshop? But it can be also something negative which made you to learn something new or to think different than before.)

– shitty weather and I hurt my back very badly in the end because of too much work

25. Did you have an „aha moment" during the workshop? If so what was it about?

I ALMOST DIED.

27. What was the worst thing during the workshop?

~~The whole workshop was a disaster.~~
X The weather.
The food.
~~I needed to work.~~
The client.
The tutors.
Other participants.
I couldn't do my own design.
I didn't like the design of the building.
Other : .....

18. Try to compare this course with other design courses you have done before. What were different here? Try to write down in which sence it was better, worse or just different.

A GOOD THING WAS THE TRUST GIVEN TO STUDENTS.

23. Do you feel it important to follow up the project after it's done?

IT'S REALLY IMPORTANT, TO SEE WHAT WORKED AND DIDN'T WORK.

27. What was the worst thing during the workshop?

- The whole workshop was a disaster.
- The weather.
- The food.
- I needed to work.
- The client.
- The tutors.
- Other participants.
- I couldn't do my own design.
- I didn't like the design of the building.
- X Other : WHAT ON MATERIALS

29. Among the listed below what were the most important for you during the workshop?

Rank it with numbers 1-5. 1 means the most important 5 the least important

- possibility to learn more about the site
- 5 possibility to learn more about the tools
- 4 possibility to learn more about the building technic
- 1 possibility to learn more about the whole design process
- possibility to design
- 2 discussion with the tutors
- discussion with the clients
- 3 discussion with eachother

31. What does context mean for you?

IT'S NOT ONLY A PLACE BUT ALL THE CONNECTIONS WE HAVING THERE.

10. What did you prefer?

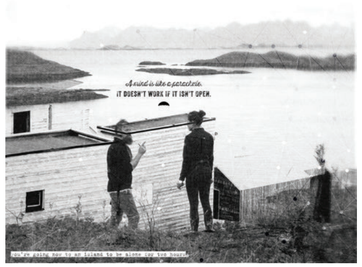
- X Working on different type of job to try out and understand more type of things.
- Working on the same type of job for a longer time to make myself better in that task.
- Other:

Building with what is available opens students to vernacular crafts, new modes of production, and deep connections with previously unfamiliar places and ways of life.
The students asked several times to get guidance on the use of tools in order to enable their abilities with such tools and be able to make a good quality handwork (craftman). In the interviews that follow, some students said: „It was not enough that we had the working tools and the materials in our hans, because practising alone was not enough to be able to carry out the task in the proper or desired way". Moreover: „We would have liked to get some tutorials and personal help in order to learn out to build properly". In particolar, one student said: „I knew I was putting the nails in a ugly and uncorrect way, but I was not able to improve myself alone. I really wanted that someone teaches me how to do it properly."

"Be alone on an island for two hours!" - teaching experiment with Hannes Praks

On the 3rd, 4th and 5th days we decided with Hannes to send the students to be alone in different islands around.
We didn't introduce our „project" in front of all the students, but we told them individually (one by one) that they were going to take by a boat to an island to be alone for two hours. Most of the islands were without any built architecture.

We gave small assignments to the students, but the aim of the „assignments" on the island was not only to complement, but also to nurture the atmosphere of a particular landscape experience, which in turn influences the entire design approach.
Students were asked to find 3 specific places on the island and to make sketches of those. They were also asked to make a haiku in their own language.
On the other days we gave different tasks (like finding a problem and giving a solution for that or taking a physical object with them from the island) but the aim of the „assignments" were always the same: to offer the possibility to spend 2 hours alone on the island, to sense the atmosphere of the place, to understand the place and their own feelings.
More than this we wanted to break a bit the hierarchies in the groups. On the first day we tried to send away the leaders, the strongest personalities from the groups so the others also can act as they would like. We thought it is also a good experience for those who started to feel their role in the group too much important, that they realize the work can go on even if they are not there.

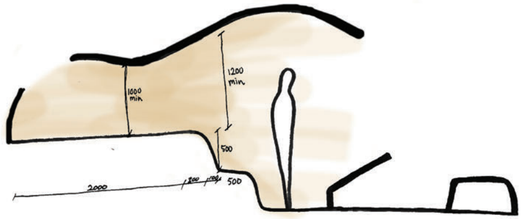


About the group works:

Students were working at the end in three different groups in three different places of the site. One group was making a fire place, an other one was supposed to make a community centre for the project and the third group made a bench.
As soon as the groups were made they were let completely alone with the making task.
This clearly made some tension in the students.
An other tension got created in the second group when they realized that actually there was no place, nor material for making the „community centre".
It was very hard for them to accept not to build „something bigger" than „just a pathway".
The most concrete building act was for the bench group who actually made an artefact til the end of the workshop.
Still the tension came also in this group since they didn't agree on the design. The result of this tension was a split in the group. The nex group born from the third one made an extra bench.
The only problem was that they didn't decide where to put the bench. Like this they made a prefabricated bench in a context where they actually had the possibility to make something taylor-made. (completely the opposite of the aim of this course_they didn't realize it_we didn't make them to realize it)



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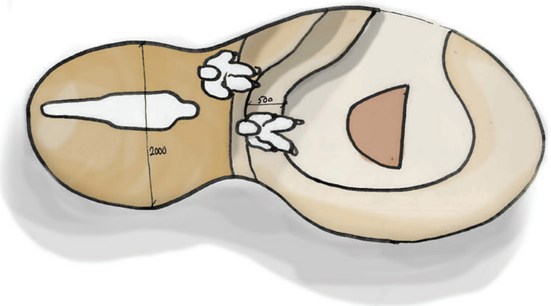
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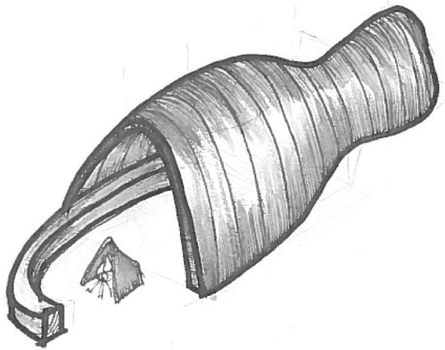


•Social impact of the projects

One of the key aspects of 1:1 scale building workshop is the social impact of the projects.

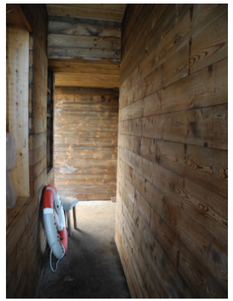
All the students stated (both during the group conversations and the semi-structurized individual interviews) that the social content of a workshop is extremely important for them. They believe that if we build something we should help, with that act, a small community or someone who has the need for that. In our case the projects were not lead by social needs and all the students agreed that when they realized this they felt a big fall in their motivation about the building which they needed to rebuild inside themselves. Many of them tried still to find a social side in the projects to get through them and keep the interest until the end.

•control over the building process and the final object

Another important feature that makes students fascinated about 1:1 scale building workshops is the possibility to follow the project until the real object is made, and to experience teamworking with the other actors of the building process.

In the last decades collateral sciences to traditional architectural design are becoming more and more important. In this context, the number of specializations connected with design is increasing rapidly, and the task of architects is becoming to synchronize the work of the specialists. This is only possible in the spirit of cooperative teamwork and through harmonious collaboration.

Through the individual interviews, I could understand that architecture students have the wish, for the time they will be out from the university, to be able to communicate better and synchronize their and the other actors' job during the design and building process. Furthermore, they already feel that if they don't take part in the building process itself, they lose the control over the final artefact.
The majority of the students stated that it is not the manual work itself what is important for them in the 1:1 scale building workshops, but the possibility to find out the details on the site and to have an overall control of the building.
All the interviewed students said that control over the design is very important and none of them believed it can happen through drawing the building and the details. At the same time it also means that none of them could imagine how to deal with a bigger, more complex building. Some said : „I think in big buildings the details disappear, therefore it is not so important to control them." Others simply fully lost the interest about designing in a bigger scale.

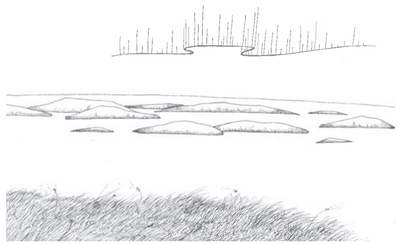


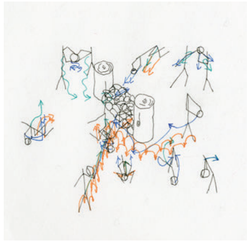
„If you are going to do something important today, you are going to do it with others." said Paddy Aschdown in a recent TED lecture.
It is important to learn how to work and act with others and not only for others.
Nowadays design deals with such complex problems (even simple problems became complex because of requirements, documentation, regulations) that no expertise alone can solve these problems.
We all need to learn how to share our knowledge and experience, how to contribute to each other's works and how to be able to work on the same problem together.
I believe this is our main goal for the future as local as in global perspective.

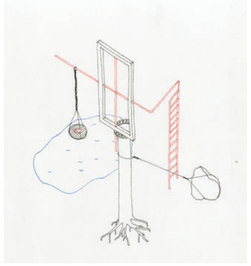
We had 24 students from all over the world. Together with other actors, we can talk about a group of 30 people who need to collaborate. It is clear that groupwork is a fundamental aspect in 1:1 scale building workshops.
During the course, it continuously popped up as a „problem" that the group was too big. Still we have to keep in mind that if we talk about „real life projects" in architecture, it is quite common that 30 people need to work together.
Architecture is not a singular act. Hence it is very important to learn how to act in a group.
In the first two workshops, which were outdoor, the students worked well as a group, but as soon as they were inside the university studio they were not able to collaborate and act as one group. At the very beginning of the third workshop conflicts appeared which the students instinctively tried to solve by dividing themselves in smaller groups. The subgroups were self-organised by the different tasks of the project (design group, economic group, workshop group, manager group...). Still the conflicts remained and dividing the group in smaller entities revealed not to be a solution. The situation only got better when all the students meved to the workshop lab where they were eventually building with their own hands.
A deeper analysis of the group dynamics in connection to the different features of the three workshops will be presented in the discussion section.

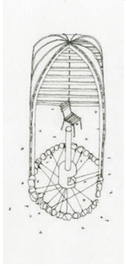
During the first workshop in Valsøya, where it was hard to forsee the whole building process, students needed to follow step-by-step instructions. This was a very much unusual situation for an architect who is originally responsible for conducting the whole process of building from the idea until the ready artefact.
One of the main aims of the Design in Context is to put the students out of their comfort zones. This situation for sure fulfil that will. The students needed to take the role of the worker instead of the role of the architect.

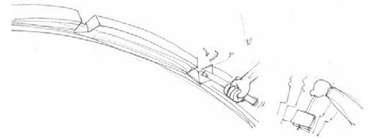
I observed two main types of personalities among the students in this position. One type was able to concentrate on the task he or she got or choose as a „worker". These students had not better or worse understanding of the whole process they got involved in, but they had more trust in the teachers or local people's knowledge. Here I have to mention that the building technique we were using was as much new for the teaching staff as for the students.
Another type of the students was less able to put on himself or herself the role of the worker. Those students kept strongly their architectural attitude. They wanted to fully understand the process and to be able to plan day by day the activities.
In the discussion session, this topic will be analysed in connection with students' motivation.











The classical way of formation usually is that the architect doesn't build itself the building. The architect has a deep knowledge on buildings and architecture which he couples together with the information about the "new problem". From this coupling the architect makes a vision about a new building. He or she then turns this vision, idea into drawings, models, texts and data. He or she gives information about "the imaginary building" to the other actors of the building process.
Because this is the standard procedure in real life situations, we usually use this same procedure (and method) during the years of education of becoming an architect.

Generally, when we design next to a table and far from the site, we start with drawing the site. This is because we are looking for references to be able to get the first inner thoughts for the design.
When we are actually on the site, these reference (anchor) points are already given there. To be on the site makes much easier to take decisions because there are more constrains that help with this. The effect of the proximity to the site is evident when comparing the design process and the outcome of the second (Fleinvaer) and the third (Hessdalen) workshop.
In both the students were designing and realizing the artefact, but while in the second workshop the students were able to come to conclusions with low tension and easily, in the third one the students were not able at all to agree on decisions to be taken. For example, a student reported, during the follow up of the course, that „ one day I got frustrated because of all the endless discussions and the fact that we never could take decisions. From that day, I was not able to go to the meetings anymore, and I only followed up the project when it got to the point to realize it in the workshop".
In my opinion one of the reasons that explain the difficulties of the students with the third project is that the design was not developed on-site, but only at a later stage, far from the place, in the university studio. The fact that the concept was not developed on the site led to an intrinsically weak design proposal. As previously discussed (discussion 3 _ body and brain connection) the sensation of the body on the site is very important for the students. The lack of this body experience was evident during the third project.
I did not participate in the first two weeks of the third workshop, so I cannot report observation from that period. The students developed three proposals, and these were sent to the client, who eventually chose one of them to be realized. The students had all good background and skills in design, and to some extent also skills in building process that they gained through the previous two workshops (including knowledge on the building materials). Still I could not see these experiences in these drawings. The students were only drawing shapes without thinking about the construction. Those drawings had no connection with the material they were going to use later.
On the contrary, during the second workshop it came more natural to develop concepts connected to the making of the design.

A couple of weeks after the start of the third workshop, the students sent their proposals to the client. Through sending out the proposal to the client the students intrinsically offered that they could build them, though they had not consciously realized how this could happen.
During the following steps of the project the stu-

dents got aware that they had not thought about how to realize the proposal chosen by the client, and this led to a very conflictual situation in the group.
As I see this, though they went to visit the site, there were not enough reference points (limits) in the beginning, or they were not able to store this information from the site visit and take it with them for the design in the studio. Such reference points could have helped to make proper decisions. Hence, they developed in the studio just a shape, which turned out to be a sort of „trap" for them, something almost impossible to solve.

It became clear that it was much harder to act far from the site.
As I discussed in the previous chapter (discussion_3 body and brain connection), my opinion is that being on the site while conceiving the building, and therefore being able to use all our sensations, leads naturally to a design method that generates a good building. Of course, there are different type of design methods, but my observation during the course was that the majority of the students still missed a design method. It is evident that 1:1 scale building workshops, where design and construction are both done at the site, give to the students an instinctive design methodology that allows them to make decisions easily, and this way to design and realize artefacts in a natural way.
Since the students didn't have yet their own built design methodology and during the third project they were far from the site, the decision making didn't come naturally, instead conflicts evolved in the group.
Of course, it also should be mentioned that during the third project these 24 students spent together their days inside a building instead of being outdoor, and this might have also an impact on the fact that conflicts rose.
In my opinion being outdoor on the site intrinsically gives better chances to lower tensions between people as physical proximity can be more freely managed. Outdoor conditions often gives a heathier learning environment. The students themselves reported during the interviews that when they were outside they felt less need of the presence of the teachers.

An interesting unexpected outcome of the workshops concerns the students' awareness of the responsibility of acting as architect. During the semi-structured interview the students were questioned whether or not they felt the weight of designing an artefact that will be actually built – something unusual for them. Among those who were questioned about this, no one reported that it was different from the time they designed in their regular courses' projects that never would be built.
Regardless the fact that they did not feel any additional weight because of the building being realized, they reported that they had felt more confident while on-site making 1:1 scale building than when they are designing on the paper.
This confidence shows once more the influence of the real on their design skills through the role of the body as a sensing tool that unconsciously helps them in the decision-making process. The concept behind the "design by making" approach was clearly proved in this course. According to my observation during the course the body and brain connection is indeed a very powerful and natural resource for design that deserves to be highlighted and exploited.

But why is it easier to make decisions on the site and not on the paper? (this is discussed under the chapter “body and brain connection”)
missing a lot from here

In this chapter, I'm going to discuss issues which are very important to answer not only from the educational point of view, but also in terms of the creative design process. One important point for me is what the necessary ratio is between intuition and consciousness to create original works successfully. In the creative process this question can be formulated as to what the ideal creative attitude is. When and to what extent do we rely on our intuitive way of thinking, and when and to what extent do we rely on our professional knowledge and awareness gained?
From the point of view of education, the intuition-awareness issue is related to what can be teachable, and what are the tricks, solving methods that, thanks to the experience accumulated, can come into the surface as intuitive ideas. In case of a professional design task, what can the concrete formulated professional knowledge give us and where does the talent start? How to teach this profession not only to give recipes or clichés, but rather to develop students' creative problem solving ability.

1:1 scale building workshops seem very good tool in order not to develop only clichés, but improve the problem-solving ability.
Especially in our specific cases in the Design in Context course we used an "upside-down" design methodology which required the students to start thinking out of the box.
We started to build without any analysis, without drawing plans, and having no discussions on the project. We through the students into the deep water.
In the first workshop in Valsøya, where the students were only in charge of the construction without making the design, they could experience the role of the workman on a building site. This workman (in our case) has no knowledge yet about the building technique he is going to use and the shape of the building he is going make.
This way of starting a construction can sound quite scary. Not all the students could benefit from it as a learning process, but those who did got a very different way of thinking and understanding.
This workshop was design through making in all sense. The building came out from a continuous reflection on the situation we had there.
Thinking back together with the students (group interviews/individual interviews) makes them to realize how well they were actually able to make decisions on the site, how natural it was to make the steps of the construction following each other. Here they see direct link (relationship?) between the manual work and the conception, as well as the relationship between the building and the site gets, in their brain, a stronger meaning.
In Valsøya the students only knew that the sauna they were going to build was going to be a 4m x 4m building. Though the place where we should build was given, they needed to decide about the exact site. While half of the students were preparing a working place next to the road (where the construction material arrives), the others started to clean up a part of the forest. They got some limitations because of unmovable roots and stumps. As they reported it was just natural to find the exact position of the building. "The stump decided for us."
They only could define the exact place of the walls deciding simultaneously the exact place of the oven. Since the oven needed a flat surface as a base the decision was made again by the site.

Though there was not a ready plan about the building before we started the construction (therefore there was not a plan of the building process itself too), it came natural to work in the right order because of being on site.
When the frame was ready as a foundation of the walls it became clear to the students that it was missing a beam in order to support the floor. The position of the beam was again already decided. This time by the oven.

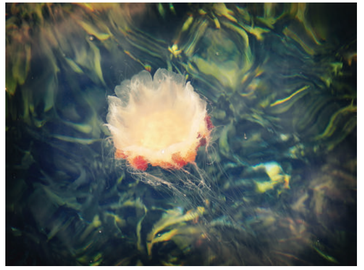
But was really the oven, the root, the stump those that decided for the students?
They felt so. (I write about it in the chapter why students like 1:1 scale workshops. Lack of design methodology,etc.)
Actually, it really can happen that there are unmovable roots or other site-given limits. Still in my opinion many of these decisions were made by the students. Unconsciously and driven by the given situation, but still made by themselves. They were using their body with all its senses (intuitive way) instead of their conscious mind.
A conscious mind could actually go for some other solutions also, but the sensing body can make decisions much easier. That decision is faster than actually start to think about several solutions.
This leads to the question why is it easier to make decisions on the site and not on the paper? The answer could be because of our sensations, that is the way we experience (sense) the world around us. This experience is multi-sensory in its very essence. The judgement of environmental character is a complex multi-sensory fusion of countless factors which are immediately and synthetically grasped as an overall atmosphere, ambience, feeling or mood (11) As Merleau-Ponty notes: *My perception is [...] not a sum of visual, tactile, and audible givens. I perceive in a total way with my whole being: I grasp a unique structure of the thing, a unique way of being, which speaks to all my senses at once. (12)*

When we sit in our office (or school) building it is much harder to make decision about a building that will be built in a totally different place, because we only can think about the site and the future building without experience the context. Our senses cannot help, because we only can sense with our body the room where we are.
If we already have visited the site that is a plus. We can have memories about our first feelings, we can have pictures, drawings, etc. Still the smell of the place, the sounds and other inconceivable characteristics of the place are not with us. For sure a good, experienced architect can make these first decisions at the site very quickly, and he or she has a good method to store in himself or herself these sensory experiences. Later these sensory experiences can be recalled in his or her studio during the design far from the site.

It became clear to me during the course that for a student, who is still without this ability, it is a very good help to be on site all during the design process. This is why they feel themselves much more self-confident on the site.
As Juhani Pallasmaa says, *we grasp the atmosphere before we identify its details or understand it intellectually. In fact, we may be completely unable to say anything meaningful about the characteristics of a situation, yet have a firm image, emotive attitude, and recall of it. (13)*
The use of the body as a sensing element during the whole design process was clearly a leading el-








ement in the decision making at the sites of the workshops, therefore became the key aspect of the design.

It is evident that the architecture of traditional cultures is also essentially connected with the tacit wisdom of the body, instead of being visually and conceptually dominated. Construction in traditional cultures is guided by the body in the same way that a bird shapes its nest by movements of its body. /Juhani Pallasmaa: The eyes of the skin_2005_p.26. /

One of the main aspects in 1:1 scale building workshops is the role of craftsmanship in the building process. In this context, the students can experience with their body the acts necessary to make the building which they usually just draw on paper. These types of experiences are useful to make the students more aware of the real meaning and impact of their design when it comes to the construction.
The learning outcome when a student first takes part in these workshops is mostly connected with the crafts used for the building process. At this point we cannot yet talk about craftsmanship, since that only can happen after many years of continuous practice.
In this situation, it is never clear the border between architects, craftsmen and workers. In this section I am going to reflect on the meaning of these different roles.
Both craftsmanship and architectural design rely heavily on tacit forms of knowledge (skills, experience)

The erection of built architecture can be seen as a system of distributed knowledge, where the transfer of knowledge from the architect towards the craftspeople is crucial for the successful implementation of an architectural concept into physical space.

The architect primarily acts/performs in his mind with the help of his or her theoretical knowledge. He conceives ideas which he translates to drawings. Usually he works in front of his desk.
The craftsman (and workman) acts/performs a manual labour through his or her practical skills in a specific building field. His works originate from the architect's idea, he uses the drawings of the architect, he is at the end of a long chain. He makes use of his hands, he moves, he prepares, assembles the materials. Usually his workplace is the building site. Oppositely to the architect, he acts/performs in reality with the help of his or her body experience.
The two roles interact in the following way: they meet on the building site not in the office; the architect makes most of his works before he meets with the workman; both professions are working for the building but in a different place and at a different stage.

However in the contexts of the 1:1 scale building workshops these two roles are often mixed. We go there with our architectural background but we try to act also as craftsmen (which we are not yet) so we are both at the same time.
Crafted construction depends on a combination of explicit and implicit forms of knowledge.
Explicit knowledge describes communicable and expressible knowledge. It can be written down and in turn understood by reading; it is rational. It includes different components, which are relevant for the construction process.
Implicit knowledge on the other hand describes the forms of knowledge that cannot be entirely communicated. It contains skills and dexterity, whose roles are described by David Pye and Richard Sennett, among others. It can only be learned by imitation and repetition, by making; knowledge is built up by physical practice and is therefore equivalent to experience: like riding a bicycle, it cannot be verbalized. (3)

In these situations, explicit knowledge can be material knowledge (for example knowledge about the specific characteristics of wood); process

knowledge; construction knowledge (e.g understanding of the functioning of particular wood joints as the fundamental of a construction or the understanding of a whole, complex construction system); knowledge on tools.
Conversely, implicit knowledge can be that related to the body and brain connection; the ability to sense and decode the place; more in general the intuition, that is the ability to judge and evaluate a situation or a material in a holistic way.

Discussion on craftsmanship through Richard Senneth

Craftmaship

- quality
- passion, something that comes from the heart, something that is for the community --> contribution to the community (sociable expertise is the very essence of craftsmanship
- appreciated in the community
- making things well --> flow in the mind

Brain and hands work together.

Brain	Hand
Theory	Practice
Inspiration	Working / outcome / developing
Developing	Inspiration

Craftsman understands his work so well that he is capable of developing further --> innovation, evolution (so part of human being).

Hanna Arendt talks about homo faber vs. animal laborens. Homo faber is a man good in physical as well as metal work, he is the practical man (“man as a maker”); the homo faber asks the question: “why”. The concept of the animal laborens is instead based on the autotelic work, and the animal laborens asks the question: “how”.
According to Sennett we are all homo faber and animal laborens at the same time. To be a craftsman and artist one needs to have the knowledge on practice, theory, technology, and development.

As Andrew Freear said: „Working in teams is a great life experience. Apart from marriage you don't get it in life." (9)Marriage is as much challenging as beautiful. That was the same with the team work in our group, and we have to admit that this 24 international students team had a divorce in their marriage at the end. If we would like to be fully honest it was a heavy task to finish to raise up their last child (third workshop – UFO observer in Hessdalen) before divorcing, and we also can say that this child got some bad effect from the spoiled marriage. Though we (teachers) kept on saying that this happened because of the big size of the group, none of the students shared this opinion during the interviews. All of them said that they only believe to work in a group where people have similar way of thinking which was not the case in this group. My personal opinion is that this is one of the main reasons why we cannot fully step back from the project as tutors, cause our role should be to avoid these big crashes in the group. Tutorial-free project only can work with very small groups or with groups where people can engage with each other. In a university group is not possible to take it granted that 24 students have the same mindset. Therefore we should help them to go through on their path. Clearly, it is them who need to take decisions. It is right to give them the chance to make everything themselves, to be responsible for their own choices. This should motivate them and help to do their best. But none of the cases are the same, and if there is really no agreement on things, it is better to make small interventions from the beginning than make crucial decisions for them. The students in the course Design in Context felt that the teachers made choices for them which they didn't like. Instead the aim of the teachers was to let them to be free.

When only making models, the perspective is close to a perpendicular projection leaving the spectator entirely out of the created world. In 1:1 human scale exercises, students use their peripheral vision, which enfolds them in space in a sensual experience, which becomes part of their world. Due to its scale, architecture plays a different role than any other art form as *"it not only represents the apparent order of reality, but transforms it into a human scale and creates the actual spatial order, which arranges the architectural framing of life around a person, and hence leads the person to the deeper understanding of his 'own' world through the continuous repetition of the experience, routine itself." (21)*
Dealing with larger scale also means working with more serious materials and tools and mastering these provides a feeling of control and empowerment.

The act of building, in terms of the 'Learning By Doing' form of architecture and spatial education, teaches about the spatial environment by definition and does it with a sensible touch of reality - something that has been missing from educational programmes in the past decades. "The mystery of things being created" is stimulating and
awakens our curiosity, yet the mystery of the things created by us is even more inspiring. (22)

1:1 scale also requires participants to step into the field of cooperation. Basically, the size and weight of materials and structures require more persons to work together. The experience of coordinating with others in co-dependent situations helps to form social competences improving
their participation in teamwork, which is the method contemporary working environments require more and more frequently.

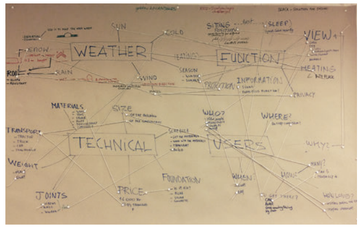
In our case we should say local, but the students were from different countries which made it in a way global...also the old Norwegian building technique...
Development is more a social phenomenon than a technological one: if we cannot do our design built project within the local social framework, we should stay home. Identifying relevant social entry points will therefore be just as crucial as doing our projects.
Usually 1:1 scale workshops include participants of different ages, cultural and educational background, and even social position, set in an unfamiliar cultural context. This often leads to building solutions that the participants are not familiar with, with relevant implication on responsibility for a solution design for a context that the participants may not well fully aware of. The small scale of the building project allows very specific and adequate solutions to local challenges to be realized during the intensive design work and execution on site.
University infrastructure provides a substantial variety of experts who can help reaching very meaningful concepts, while the participation of local craftsman adds the necessary reference to the reality of locally available materials, techniques and skills.

From an institutional and curricular perspective, design/build offers two related tracks: simple beginnings and complex syntheses. Its process asks students to bring together all that they have previously learned – conceiving design schemes, developing designs, working in groups, crafting models, presenting to reviewers (now clients), calculating loads, choosing materials, estimating costs, detailing joints, and even finishing a project.. At the same time, it brings students back to the foundational elements of shelter and the root meaning of architecture: What do we design? Why do we build? For whom? Where is the appropriate place? How do we build?

pros::

- to foster a collaborative and consensus-driven design experience
- to teach the value of collaborative thinking and understanding through building
- to learn how knowledge of building expands our knowledge of design
- to develop communication skills in all media and situations, including building techniques that integrate concepts with methods of construction
- to improve students by broadening their experience and skills
- to provide students with a range of roles in the design/build process to help them in future life choices
- the unusual, the strange, the unexpected situation can awake the creativity, the ability of problem solving
- skills such as entrepreneurship, teamwork and communication +
- 1:1 scale building workshops seem very good tool in order not to develop only clichés, but improve the problem-solving ability.

it can also be dangerous to be too close to the real world, too compromised by the demands of the market. If the university stays more ideological, there is more hope that we can have an influence on the society and not only to serve the market. We should serve the people/society, not the market, therefore when we talk about reality we should talk about the real needs of peoples not the real need/offer of the market.
University should also provide the fundamental skills in practice, but this cannot overrule the skills of design.
It is a good to get the possibility to strengthen skills such as entrepreneurship, teamwork and communication since these can help to stay on our leg as fresh architects, to fight for new ideas. If architects don't know how to deal with „the real world" they cannot make changes in it. But it is the same if we only concentrate on the outside world, the market, if we only follow the rule of the market we cannot put new value in architecture.



Involving students in 1:1 scale building workshop can be a terrific/fantastic/effective strategy to improve their competence not only in materials and building techniques, but also more generally on design competence.
Even if when full scale building workshops started, the main aim was to introduce the students to building techniques, many more aspects can be taught through this activity, ranging from structural mechanics to design methodology. Designing and building in real scale gives the students the possibility to feel more confident and to express their potentials in several disciplines of architecture.
However, this investigation has also shown some important aspects that need to be carefully considered in order to assure successful workshops and learning outcomes.
First of all, the research has highlighted the importance of being on the site, and of being outdoor, as cornerstone of "effective" workshops. The presence on the site gives the students anchor points that help them with the design task. Moreover, they can, more or less consciously, develop in this situation the ability to "sense" the context and acquire this ability that can later become an important part of a design methodology.
The connection between the ability to "sense" the site and how this is enhanced through 1:1 scale building workshops has been a clear output of the observations of the three workshops. It has also been evident that "sensing" the site has a clear impact for the students while they designed. This ability can become an important element to be included in a design methodology that can allow good architecture to be design not only while building it on the site.
This topic is strictly connected to the use of our body as a sensing element, and to how these sensations are logically (or emotionally) processed by our brain when then a more step-by-step procedure is used in the design process.
The role of our "sensing" body and its implication on the design, together with its integration in a design methodology is one of the most interesting topics revealed by this investigation which are definitely worth being explored more in the future.

While on the one hand to take the students to the building site without a specific preparation can open up for improvisation and unpredictable outcomes that might not necessarily be negative, the observation in this investigation, confirmed by the same students, reveal that a lack of understanding of the aim, process, materials, techniques may make the students less motivated, with the risk of impairing their involvement in the workshop – and therefore their learning outcomes. To plan the type of competence to give to the students in advance and the type of competence to be acquired at the site might be challenging, but efforts need to be done before designing a 1:1 scale building workshop to assure that the right balance between these two competences is reached.
Moreover, it is important that the 1:1 scale building workshop is not reduced to simple manual work, where technical practical skills are emphasised over design skill, and it is fundamental that the workshop is used to provoke discussions about the physical environment, especially if the course involve master-level students.

Records and documentation are very important parts in the learning process from 1:1 scale building workshops, since it is very important to reflect on the things happened during the workshops. One of the common features of the 1:1 scale building workshops, regardless where and in which frames it happens, is that it lets the participants to make mistake, and one of the main assumption behind this type of activity is that to make mistakes is a good thing. I can agree with this, but only if at the end the students also learn out of these mistakes. To be able to learn from a mistake we need to understand and formulate that mistake, and reflect on it.
If we do workshops without former design, without documenting during the construction and reflecting on it after the building process, we lose a lot in terms of potential learning outcomes.
An important aspect to be further developed is thus how to make the students reflecting on their mistakes, and more in general on the entire workshop process, so that their learning process does not terminate when the workshop is over, but continues once they have left the building site.
To further investigate 1:1 scale building workshops can contribute to develop not only an effective educational tool in architecture education, but as revealed by this study, 1:1 scale building workshops can also give good insight in the architect profession itself.
These workshops can unveil hidden problems (conflicts) in the profession in a changing world where complexity is growing while our resources are falling. Among the others, one very up-to-date thread in todays' debate particularly highlighted in 1:1 scale building workshops is the role of architecture as a promoter of a sustainable development of our environment, where a more conscious use of the natural resources cannot be delayed any longer.

1:1 scale building workshops expose students to an extensive teamwork, where different roles in the design and construction process are collected and need to act together. This shows them how the real process is today in architecture, and how much complex is becoming the profession of the architect.
In the 21st century, an architect needs to have an enormous amount of knowledge to get to the right solutions. This includes competence on materials, structures, techniques, physics, and of course good skills in design, which also requires understanding the history and theory of architecture. Getting there involves also mastering the art of problem solving using critical thinking and learning how to make decisions. Our life, lifestyle is changing in these days so rapidly that it is extremely important to be able to be flexible, to be able to keep on learning lifelong. We need a lifelong effort because the necessary skills and knowledge shift over time. Education has to be able to help students to develop thinking and reflection skills parallel with acquiring existing design knowledge.

Intuition vs. planned process is another important aspect of the profession that is particularly exposed in 1:1 scale building workshop. As previously described, this debate is very crucial in designing an effective workshop in terms of learning outcome, but it also has very heavy implications on everyday design process for an architect. Of course, good architecture probably needs both deals, but to investigate further the tension between these two opposites is definitely a worthy activity. To use more full scale workshops in order to gain more understanding of the dynamics shift between intuition and planned process could be a suitable strategies that can lead to interesting results.

1:1 scale building workshops takes also us to the question of the use of digital tools in architectural design. If on the one hand it is a clear trend that virtual models need to be part of the integrated design process (also in relation to the increasing complexity of the profession and the link with other professionals), on the other hands it is clear that the future generation of architects, even if growing in a very digitalized world, cannot give up the idea of "using" their body in the design process, both as a sensing tool (as mentioned above) and as design tool itself.

To be on the site, to touch the materials, to shape them and to place them is something that no virtual reality can (so far) give. The question then how to balance new technology and "old-style" activities in the profession is an important issue that can be explored also by a further investigation in these full scale workshops.

Full scale workshops are often connected to special situation and the use of architectural spaces for improving the lives of people with special needs is an extremely powerful tool that should be explored more. In this context, 1:1 scale building workshops could be used as part (or as main component) of a research methodology to investigate the relationship between space and people's wellbeing. Workshops give the chance to realize, in a short time, small interventions characterized by architectural features whose impact on people's life can be observed and described through the follow up of the new artefact. They can thus be used not only an effective education activity and as a source for architectural debate, but also as a tool in architectural research.

Finally, the social role of architecture is also highlight in 1:1 scale building workshops. The students have clearly revealed their commitment to projects that are useful for the community, and when they realized that the workshops they were participating were lacking this aspect, many needed still to believe that there was a social side in their job. This extraordinary behavior shows how much important is the why and for whom are we designing, a central issue in the architectural debate that definitely deserves a good deal of attentions.

questionnaires, interview questions, etc
personal narratives
activities during the semester

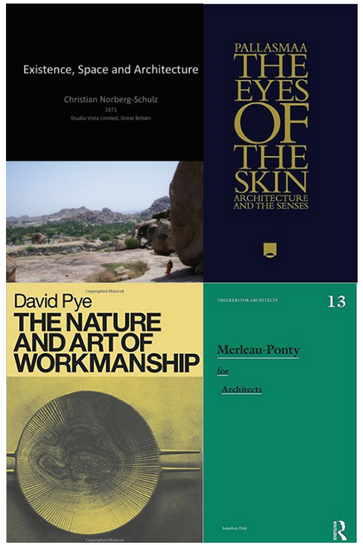
Questions I had inside before the semester:

- the methodology as a different design method
- the methodology as a teaching method
- the methodology as a different design method
- what is the role of intuition in design _ how much all our designs are intuitive designs
- is it more or less conscious to design and built on the site? How much conscious can (should) we be about our designs?
- how much impact of these workshops have on the communities _ how much responsible can we act as architects in these situations?
- what does it mean to be on the site, act on the site, design on the site, built and design at the same time, etc. (senses, feelings, materials, touching, meeting, talking, sharing _ facing to real problems, limits, people, etc.)
- are we making 1:1 models or real buildings?
- is the focus only on the physical building (experiencing the building process itself, materials, experiencing everything through our bodies etc.) or actually there is much more behind? (ethics of architecture)
- how much the student's way of thinking about architecture in general modified by these workshops?
- When we think about a design and start to draw, sometimes our hands makes more than what we expected. What about when we actually build with our hands? Do we do more or less than what we have expected?
- When I think and draw I always feel free. Instead in front of my computer I often find myself a bit trapped at the same time lost (in scale, in details, keeping up the important parts). How is it when it comes to real building without much planning before? For sure it gives limits. But are those helping limits that make us actually more free or is it easier to loose the architect part (putting there something plus which is always hard to explain) and to become a craftsman?
- Whose is the ownership of the design of a workshop? Is the ownership of a design important?

- What are the role of the teachers in the 1:1 scale building workshops?
- What are the learning objectives for a building workshop (technical skills, design methodologies, interpersonal skills, ?) ?
- Is it realistic to completely change the learning environment from classical lectures to 1:1 building workshops?
- What are the limits of the different type of learning activities?
- What is the impact of the student state of education (year of study) on the learning outcome of the workshop? What did you teach through 1:1 scale building workshops to the students?

How much and what type of theoretical lecture did you give to the students during these courses? What do you think is the difference in understanding theoretical concepts through conventional lectures or 1:1 building workshops?

- are we making 1:1 models or real buildings?
- how much the student's way of thinking about architecture in general modified by these workshops?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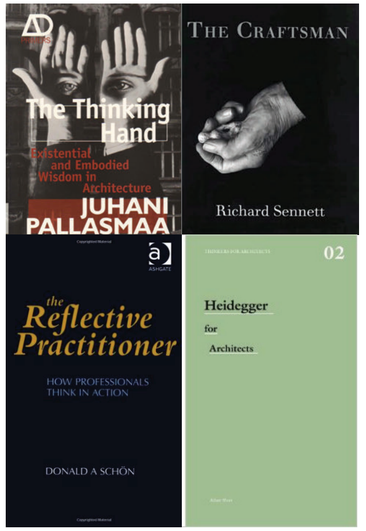
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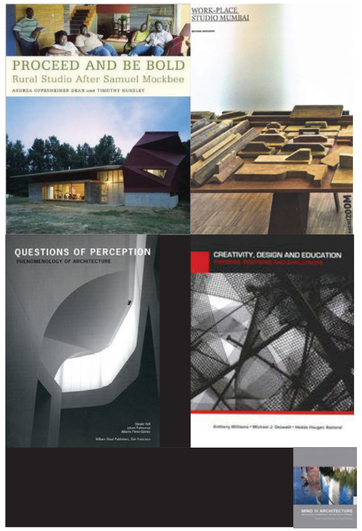
WORK-PLACE STUDIO MUMBAI
PROCEED AND BE BOLD
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