

The Faculty of Architecture and Fine Art

EVALUATION REPORT 2015

Master program in Architecture
Master program in Sustainable Architecture



NTNU – Trondheim
Norwegian University of
Science and Technology



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EVALUATION REPORT 2015

5-year Master Program in Architecture
and
2-year International Master Program in Sustainable Architecture

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NTNU - THE FACULTY OF ARCHITECTURE AND FINE ART
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Preface

On basis of discussions and developments at the faculty in the latest years concerning the overall profile, content and structure of our architectural education, a need for readjustments has grown from within. To help us develop a more consistent and coherent program we decided to use the periodical evaluation system at NTNU as an opportunity for a more comprehensive critical review. In the spring of 2014 we started planning the evaluation to be a process going on through several sessions, each one focusing on participation and contributions from staff and students. Three basic values were guiding principles: an open process, broad participation and high quality.

The committee was invited to define their own way of working and to let the work unfold based on what seemed adequate. Thus an open process within some structural elements was achieved, which in the end has provided us with important insights, critical perspectives and, may be most important, inspiration for development.

A broad participation from both students and staff has been a crucial element in at least two ways. One to inform the committee and second to let ideas and needs from all levels become part of the development of the program.

The committee was put together by people representing both broad and specific expertise within the field; Education developers, practicing architects, NAL (the Norwegian Architect Association), sustainability research and student perspectives. The way they actively developed this process to be a high quality review and a foundation for further development of the two master-programs, was highly inspiring and a learning experience on many levels for all involved, from staff to students.

A special thanks to the teachers and students who took the time to be a part of this process, in seminars, workshops, course- presentations and shared meetings. A foundation is now set for the challenging and interesting work to develop our program to be even better than it already is. Finally, a special thanks to the evaluation-committee, brilliantly led by Anu Yanar, for a process and product that became as good as we ever could hope for.

Fredrik Shetelig

Dean at Faculty of Architecture and Fine Art
NTNU

Bjørn Otto Braaten

Head of the five years Master Program in Architecture
Faculty of Architecture and Fine Art
NTNU



Executive summary

The committee has found the evaluation work highly inspiring and very interesting. The school is filled with individuals and a community capable of critical self-reflection and rigorous efforts, a good combination of self-confidence with a mix of humility and modesty. There is a mutual appreciation between teachers and students, both being future-oriented and committed to further development.

The committee found warm-hearted people, a good atmosphere and a high positive energy level. We would like to wish them the best of luck for the future.

The mandate / assignment

The review committee has evaluated the five-year Master's program in Architecture and the two-year international Masters programme in Sustainable Architecture. Five different perspectives have been taken into consideration: academic perspective, the pedagogic perspective, sustainability, the perspective of industry and the student perspective.

We were asked to evaluate the structure of studies (sequence and type of courses), portfolio of courses and fields of competence, the pedagogical profile, the physical environment, student admissions (recruitment, requirements and regulations), the evaluation system and organisational aspects.

Evaluation process

The committee has chosen a broad process of engagement, including workshops and a large number of interviews with faculty leaders, teachers and students. The aim of the process was for the faculty to gain insight and knowledge about fundamental aspects of their educational delivery, core values, identity and tradition. At the same time the process enables the faculty to use the evaluation findings as a resource to adapt and further develop the two programs.

The levels of aspiration impressed the evaluation committee. We found that the students, teachers and faculty were future-oriented, highly reflective with a strong tradition of collaboration, a hospitable culture and a climate of intellectual rigour.

Knowledge, skills and values – transformative learning

Threshold concepts require a *transformation* of more basic concepts, so that these become aligned with an emerging structure of understanding that fosters distinctive *ways of thinking and practising* within a profession.

The formation of the architect who will be able to respond appropriately and effectively to a society determined by complexity, uncertainty, risk and speed could be usefully considered in terms of the *knowledge*, the *skills* and the *values* they will need to acquire.

A pressing challenge for the School is to reach consensus on which skills, knowledge and values should be emphasised and experienced within the curriculum.

The architect

There is a discussion at the school about the changing role of the architect and how to educate architects for the future. But the future role is not fully defined and thus the skills, knowledge and values not fully developed.

There are a number of potential unique selling points (USPs) – live studios, planning abroad, TransArk, being a technical university, sustainable architecture and the physical space. But the committee believe these need to be further developed to become effective USPs.

Structure

The overall structure of education has a clear separation of Bachelor and Masters. There is a variety of teachers and many areas of competence. The Bachelor's level (first three years of Master) seems well planned, with all basics covered after running the same structure for several years. The Masters' semesters provide freedom of choice, but there seems to be a lack of coherence between the academic content offered. The theoretical subjects need more focus. And there remains a question of how to implement the theoretical courses, in addition to what subjects are important.

Content

NTNU provides an architectural education with a very wide approach, a willingness to embrace many areas, and to continue to transform itself. In addition to the more traditional building architecture, there is a strong field of urbanism. At the same time the school is exceptional in the Nordic countries for its 1:1 building studios, or live studios. The duality of a very local, climate-specific context and an orientation to the world is intriguing. So is the emphasis on interdisciplinary work and group work.

The content needs to become more defined and the committee suggests further developing existing strengths: the good building architect, the architect's roles and knowledge within urbanism, the 'unknown' architect in addition to the 'traditional' cross-disciplinary architect.

Pedagogy

The school is in the process of identifying a set of valuable pedagogical principles that might inform the education of a future generation of architects who are, at the same time, technically, aesthetically and professionally competent.

Pedagogical principles – such as a deep approach to learning, threshold concepts, active engagement and critical reflection— and imaginative teaching methods such as Live Studio, can form the basis of a distinctive signature pedagogy in Architecture at NTNU.

The purpose of the program and courses need to be defined and articulated through course documentation that indicates learning outcomes and identifies threshold concepts, knowledge, skills and values, appropriate teaching methods and effective methods of assessment.

Assessment and feedback

Students and teachers within the school characteristically have very open contact, harmonious relationships and work usually in close proximity with each other. Teaching staff and course leaders are easy to approach to arrange either informal or formal consultations.

But the criteria for assessment are not always clear. Assessment should draw attention to what is important to be attained within a course. This is not always the case and the grades might be misleading, making students focus on the final project and not on the process.

Masters in Sustainability

The program attracts students from all over the world, who bring with them global knowledge. It is a fairly new program and is still clarifying what its graduates will be able to contribute. The students gain interdisciplinary knowledge and NTNU offers education of international quality (for example through ZEB).

The program should explore the international students' backgrounds and knowledge in addition to making the program less people-dependent.

Physical learning environment

The workshops undertaken in the school suggested that the physical environment is disorganized and not very inspiring. It also gives students a message that it is impossible for architects to have an impact on the environment.

Student perspective / role

Overall the students were very satisfied with their studies. They were enthusiastic and discussed the School in an open fashion. They provided critical comments in a mature and well argued manner. They seemed very committed to their studies.

However the students lack guidance throughout their studies, in relation to career planning, reflection on their learning processes, on what they have learned and need to learn. The role of the students as active participants and change agents could also be improved.

Leadership

There is a noticeable atmosphere of trust and co-operation within the school between colleagues, and between staff and students. The climate of openness extends to visitors and 'outsiders' to the institution.

But there is a need for a more systematic approach to quality assurance and quality enhancement. There is also a need for a risk register. For example, are parts of the current program today too people-dependent?

The research agendas need to be harmonised with the needs of degree programmes, and research should be used as a strategic tool for development.

1. Introduction

The mandate of the Review Committee was to assist the Faculty of Architecture and Fine Art at NTNU to undertake a thorough evaluation process of the five year Masters program in Architecture and the two year International Masters programme in Sustainable Architecture. We were asked to take five important perspectives into consideration, namely the academic perspective, the pedagogic perspective, sustainability, the perspective of industry and the student perspective.

From the outset we identified, through discussion and common agreement, a set of values and operating principles that would inform our work and our relations with all those who would be contributing to the review process. We felt that the process of the review should take the form of an ongoing dialogical process between the School and the Committee, so that decisions and emerging findings would be transparent and that the direction that the review was taking would always be a matter of consultation and consensus. This approach was designed to establish the review as a participatory process intended to strengthen the School's ownership of its development and outcome. A further key dimension of our approach was the centrality of the student voice. This element was designed into our methodology to the extent that NTNU students would play an active part in the review process and would also have representation on the Review Committee. Finally it was agreed that our findings and conclusions would be evidence-based, drawing upon data gathered from the experience of various stakeholder groups at NTNU.

The aims of the Review were as follows:

- to assist the Faculty and its leadership to gain useful insights, and gain fresh inputs, into their understanding of fundamental aspects of their educational provision – their core values, identity and tradition – to assess the extent to which current aspirations were being realised.
- to enable the Faculty and its leadership to use the evaluation's findings as a resource to develop, re-envision and adapt the two programs so that their profile, core values and structure might be harmonised in an effective and integral fashion.

The Review Committee sought to engage representative groups of staff, students and other stakeholders in discussions about the quality of current educational provision, modes of possible enhancement and means of supporting the community's commitment to, and engagement in, future development of the curriculum.

The Committee sought to establish a process of enhancement-led formative evaluation that would place emphasis on participation and be in keeping with the inclusive values and open culture of the School. It sought also to generate information of a qualitative, quantitative and graphical nature that would be of practical assistance to the Faculty leadership and help inform their future decision-making processes.

IMPRESSIONS GAINED

The Committee were impressed with the levels of ambition and commitment encountered in their dealings with NTNU staff and students. An impression was gained of a future-oriented, highly reflective department with a strong tradition of collaboration, a hospitable culture of warm hearted people, and a climate of intellectual rigour.

The members of the Review Committee would like to thank the staff and students of the Faculty for the spirit of collaboration, collegiality, openness and frankness in which the evaluation took place. Their accommodating and enthusiastic response assisted the Committee immeasurably in their work and the climate of professional and personal trust that was established permitted members of the Committee to act genuinely in the role of critical friend. Our task became both a pleasure, and a rewarding learning experience in the company of talented and interesting colleagues.



2. Assignment for the committee

The Faculty of Architecture and Fine Art, in cooperation with the Faculty's board decided to carry out a thorough evaluation process for the 5-year Master's program in Architecture and the 2-year program in Sustainable Architecture. It was the intention of the Faculty to assemble a group with broad knowledge and experience in the field with the capability to develop the programs.

The objective of the evaluation was to establish and develop the two programs' capacity to educate open-minded, creative, competent and responsible graduates who are well prepared to meet today's and tomorrow's social, cultural and environmental challenges. Through the evaluation the Faculty wished to develop insights into fundamental aspects of their provision. They hoped to derive benefit from new input into their understanding of their core values, identity and tradition, to ascertain whether the Faculty meets these ambitions. In cooperation with the evaluation group the Faculty wished to use the evaluation as a tool to develop, rethink and adjust the two programs so that their profile, core values, structure and connections are working as a coherent whole.

Key issues for the evaluation group to investigate were identified as: professional discourse, the social mission, learning quality and distinctiveness and context.

The evaluation group was asked to evaluate:

- the structure of studies – levels, sequence and types of courses
- the portfolio of courses and fields of competence
- the pedagogical profile
- the physical environment
- student admissions – recruitment, requirements and regulations
- the evaluation system
- organisational aspects

Based on this, and in cooperation with the faculty, the group was asked to identify recommendations for improvement and change within selected areas.

The Faculty wished to establish an inclusive process in which everyone could participate. This would ensure that the will to change would be preserved and inspired at all levels – from the management of the faculty to the teachers and the students. Motivation for change would be built through dialogue and the evaluation process would establish this as a point of departure.

The evaluation would consist of three visits during which the committee would meet and have discussions on several occasions with the faculty management, course managers, teachers, students and external stakeholders. At the end the committee would present their concluding thoughts and proposals for consideration.



3. Members of the evaluation committee

The Committee members brought different areas of expertise and experience and represented a range of countries.

Members were:

Anu Yanar (Chairman, Finland)

Tor Inge Hjemdal (Norway)

Ray Land (UK)

Tanja Lie (Norway)

Emily-Claire Nordang (2nd and 3rd visit, Sweden and Australia)

Agustin Ruvira (2nd and 3rd visit, Argentina)

Norbert Fisch (1st visit, Germany)

Line Pedersen (1st visit, Denmark)

Detailed information about the committee members can be found in Attachment 1 at the end of the report.



4. Students' role in the evaluation process

Students played a central role in this evaluation project both as evaluators and as a source of information and insight.

- During the evaluation process there were three committee members who represented the student view (see Attachment 2).
- The Committee interviewed a group of students representing all years of the Master's program, and also a group of students undertaking the Masters in Sustainability program.
- The Committee also undertook four in-depth interviews with pairs of students.
- In order to gain more student views and qualitatively more authentic perspectives, the Committee organised a workshop for 40 students representing all years and two different programs (second visit).
- There were also student representatives participating in the workshop for teachers on the third visit.

All in all students were active in bringing their voice to the discussion.

They were very constructive and were able to make sound arguments to support their views.



5. Method of the evaluation

The Committee started work in November 2014 after the assignment was given and the members were elected. The Committee based the evaluation process on a set of values and aims which were as follows:

- to establish an inclusive and participatory process
- to allocate students a central and active role in the process
- to strengthen the ownership of the leaders, teachers and students in further developing educational provision
- to use novel evaluation methods to gain quantitatively and qualitatively richer data

The assignment was very open and there was no predetermined model or process to be followed. The idea was to plan the process in dialogue with the leaders of the School. Instead of determining the whole process from the outset, it was decided that the actual process would emerge gradually in the light of what would arise from interaction with the leaders, teachers, students and stakeholders. This absence of a pre-determined plan, instead of creating a risk for the success of the process, was, on the contrary, considered likely to increase the usefulness of the results and strengthen the ownership that the School would have in relation to future development.

During the first visit in January 2015 the School organized the program and the main aim was to derive information about the programs to be evaluated. Instead of only receiving information during the visit, there was considerable fruitful discussion and interaction with the leaders and the teaching staff.

The second visit was organized in March 2015. In traditional evaluations inclusiveness is frequently achieved by interviewing as representative a group of actors as possible – in this case leaders, teachers, students and stakeholders. The Committee took this aim one step further and organized workshops, where active participants from the School discussed issues and produced evaluation data

by interacting with each other instead of only answering questions framed by the Committee.

The workshop for 40 students representing different programs, courses and years, produced especially valuable data – both quantitative and qualitative. The idea was that the students were able to work in interaction with each other, in their own space, with their own language, drawing and writing on large posters (closer to architectural working than just verbally expressing their thoughts) and students also moved physically in space as they are accustomed to when they study (for example, they sat on the floor). Students collaboratively constructed their ideas about their future as architects. They worked on how they thought their present studies supported their development as professionals, what were the strengths and weaknesses of their education and in what ways their education could be improved (see attachment). This way of working provided additional data to the traditional method of interviewing students formally on the other side of a table from the Committee and answering questions posed by the Committee. This act of organizing a workshop also enabled students to be active producers of evaluation data as well as generators of ideas for improving education.

The Committee also organized four in-depth interviews which provided deeper understanding of the students' perspective.

Between the second and third visit the Committee analyzed all the collected data and drew preliminary conclusions and recommendations. However, instead of writing the final report based on those findings and analyses, it was decided to engage the teachers and students (not leaders) in discussing and commenting on them. The idea was to strengthen the ownership of the community over the development activities, and the discussion of the report, by providing a forum for interaction between the actors. At the beginning of the third visit in May 2015, the Com-

mittee facilitated a workshop for 20 teachers and 10 students. Different groups were allocated different themes to work on. The Committee's draft for the final report functioned as a trigger for the discussion. Participants were asked to comment on the findings, to point out possible misunderstandings, to make remarks on the text in case it were not clear and to work on the general thematic content. This workshop was organized before the draft and findings were presented to the leaders. The workshop and presentations of the groups offered valuable data for the Committee to improve the final report by making it more relevant, understandable, communicative and useful

for the School. It also gave the committee a possibility to bring the teachers' and students' views to the leaders with whom the Committee had a long meeting the following (and final) day of the evaluation process.

At the end of the third visit a seminar was organized for all the staff and students regarding the findings and recommendations of the Committee.

The Committee continued to work on the report subsequent to the third visit and submitted the report in June 2015.

6. Transformative Learning in architecture – knowledge, skills and values

The formation of architects who will be able to respond appropriately and effectively to a society determined by complexity, uncertainty, risk and speed can be usefully considered in terms of the *knowledge*, the *skills* and the *values* they will need to acquire, and at what levels in the programme. Increasing complexity of understanding in any programme of professional development is not characterised simply by more connections between conceptions. Some connections are held to be valid whilst others are not. Super-ordinate conceptions or threshold concepts require a *transformation* of more basic concepts, so that these become aligned with an emerging structure of understanding that fosters distinctive *ways of thinking and practising* within a profession. These distinctive ways

of thinking and practising lead to a particular disposition of the architect that the School is seeking to develop. In this way personal transformation can lead to social action of a critical, reflective and ethical nature. Transformative learning involves profound personal change, but such change will emerge from dialectic engagement among a group of learners and teachers with diverse perspectives. A pressing challenge for the School is to reach consensus on which skills, knowledge and values should be emphasised and experienced within the curriculum at Bachelor's and Master's levels, what kind of ontological shifts should be designed into the curriculum and what kinds of architectural disposition are desirable and should be encouraged.



7. 'Results of the Evaluation' – observations and recommendations

In this section detailed observations, evaluation and recommendations are presented under nine subtitles. Certain themes will be intentionally repeated several times. The reason for this is to approach important issues from all the relevant perspectives of the system.

7.a. 'Architect'

The role of the architect and architecture is changing; it has changed before and has been widened, but also narrowed down. At the moment the role of the architect is being discussed in a wider context. NTNU's slogan is 'Knowledge for a better future'. The students are now buying into this and believe in it in a different way than before. The architectural students are exploring how architecture can contribute to social development in a different way now from only a few years ago. This is because many of the conditions for architecture are changing and opening up, allowing different understandings.

But what are these changes? What kinds of architects are needed? And what kind of roles can (or should) the architect pursue or take?

STRENGTHS

- An aspiration or goal to educate architects for the FUTURE
- There are discussions about what kind of architect is needed in the future
- Not educating only aesthetically-oriented designers, but those with values related to social responsibility and the ambition to make a difference
- A sense of space and material (through hands-on, 1:1 approaches)
- The FUTURE is discussed (complexity, the 'big rethink' etc)

OBSERVATION and EVALUATION

There is a will or a goal to educate architects for the future. And there are discussions concerning the multitude of roles one can take and the contributions one can make to solve challenges. There is also a variety of courses one can choose from in dealing with these issues in different ways. Still the changing conditions and what and how the architect can contribute seems unclearly defined. The discussions, for example 'the big rethink', seem to include only a small core of the faculty. To work out the new roles or assignments is in process, but could the School make this clearer together with the students, and discuss and communicate the options that the students have? And who should be included in this process? What kind of implications does this have for the curriculum, and for institutional and staff development?

What are the roles and the changed conditions? It is important to be aware of the changing conditions and attitudes, and to take advantage of them in the development of future educational provision.

By not defining these questions more clearly, the challenge is that the school, teachers and programmes are then 'caught in the middle' and matters become blurred for both the students and the teachers. This 'in between' situation offers potential, but could also operate as a weakness. The weakness is that 'anything goes' and one doesn't really fulfil any of the roles or explore any of the changing conditions properly. The School seems hesitant in trying to define and communicate what the roles are, or could be. They want both the student and the teachers to explore the 'liminal space'. The students find this confusing and want more guidance. The School needs to dare to say what those 'other' or different roles are. And have an analytical approach to alternative ontologies and definition of the profession.

As an example, the result from the last 'kandidatundersøkelse' shows that about three quarters of the students start working in private architectural offices when they graduate. It is an important discussion how to educate these architects and how to relate to practice. In what way should the students contribute? Today they contribute with a good understanding of process, collaboration (teamwork) and communication, according to the offices. How could the students develop practice? What kind of skills, knowledge and values do they need to do this?

While having many of the courses contributing to discussions about the future role of the architect, there seems nevertheless to be an arena or a tool missing for a common discussion of the topic amongst the faculty, teachers and students. Could the concept of 'knowledge, values and skills' offer such a common platform to discuss these issues?

What are the fundamentals one needs as an architect?

There are a certain set of basic skills and knowledge one needs as an architect. At present the School does not define this properly. The School needs to work out what they will put into this, and mean by this, and on what level this is expected. As an example, some students deliver projects at Masters level which are drawn in *Illustrator*, not being properly skilled in any other computer drawing software. This should not be possible. How one further develops the skills and knowledge is closely related to the values one develops. The basic skills and knowledge could be seen as a minimum and could be updated in relation to the different roles that the School envisages that the architect should have, or that architecture could perform.

Are the students able to justify their values and articulate the meaning behind the things that they do?

The first 3 years seem to work well. Most of the students make good progress. But does the 'development curve' flatten out after Bachelor level? How does one keep the level of stimulus going at Masters level? What are the intended graduate attributes?

At present, can students 'slip through' the education and become an architect without doing the 'architecture courses' with the 'heavier' content? Should this be permitted? What kind of architect does one become? Do the students need more guidance?

The schools are, in a different way from earlier times, in competition with each other. The architecture programme at NTNU is in a unique position to be different from the other schools in Scandinavia, and thus contribute in a way that is distinctive from other architectural schools.

USPs (Unique Selling Points):

- Live Studios
- Planning abroad
- TransArk
- Potential in the reputation as a technical university
- Inter-related knowledge and disciplines
 - interdisciplinary work
- Sustainable architecture
- Physical spaces (the workshop availability is excellent)

The process of planning and building is developing. It is becoming more interdisciplinary and complex. By including more knowledge and expertise early in the process one saves time, becomes more accurate and uncovers the challenges ahead. This demands knowledge about teamwork and interdisciplinary work. Is multidisciplinary used sufficiently or optimally in education? Is it what is wanted clearly defined and is this brought into structures and practices?

The knowledge and research on how to further develop sustainable architecture is available, for example through ZEB. How is this exploited and included in the different programmes? This knowledge also needs to be further developed for example on an area level.

CONCLUSION AND RECOMMENDATIONS

We highly recommend further emphasis on the following:

- The **knowledge, skills and values** concept will work as a platform and a tool for discussions and further development of the content and School. How could this be developed?
- To respond to the changes in the building processes. The School needs to develop their interdisciplinary approaches.
- Should the students be challenged concerning what kind of programs to choose and what kind of roles they want to take? Should the choice of courses be more regulated? For example should students be required to complete at least one complex building course?
- Live studio in addition to the projects of both building and planning abroad are very popular amongst the students. The latter could be further explored bringing

the experiences back to NTNU and possibly investigating the developed knowledge in relation to the local conditions and context of Norway and Trondheim. Could this contribute to developing the profession in Norway?

- The 'Knowledge, skills and values' model was introduced during the evaluation process and was used as an evaluation method. We recommend that the School works with that model both on a specific and a generic level. Is it possible to work out what the 'minimum' in terms of knowledge, skills and values would be?

7.b. Structure of the programs

STRENGTHS

The overall structure of the education provision seems direct and well tested, with a clear separation of Bachelor's and Master's levels (in accord with Bologna protocols). There is a variety of teachers and many areas of competence. The Bachelor's level (first three years) seems well planned, with all basics covered. The Masters' semester provides freedom of choice, and gives the more mature students an individual responsibility.

OBSERVATIONS and EVALUATION

General

Structure can never compensate for people, but needs to be focused on if one wants to develop a less person-dependent model for the institution. However, picking and keeping the best people will always be one of the most important aspects of a good structure.

Although the 5-year program is clearly divided into its two main parts, the relationship between Bachelor's and Master's levels seems overlooked. There is a missing link in this aspect of the education. There is a question as to whether there should be a form of degree for those few who are unable to finish, or seem unfitted for an architectural career. It might be problematic that there is no clear tracking of students' transformation throughout their study. In this way, the students may see their fellows as well as themselves, repeating their mistakes or successes with no obvious development. The tracking could take the form of a teachers' meeting between courses, or after the first three years. Or

it might be undertaken through a student portfolio as part of each student's admission to a Masters course.

The School's tradition of cross-disciplinary group work is a great strength, as is the group work within the courses. However, it seems that this can be misused, so that one may avoid personal responsibility throughout the course of study. This may cause a problem in a job application process, but also mean that students miss out on an important individual experience of making choices. It would be easy enough to ensure that certain courses (including those at Bachelor's level) required individual projects.

Intake/applications of students:

At present, all students have excellent formal qualifications from high school. These are students used to working hard and succeeding, with strong intellectual abilities. This provides a good platform, but most study environments will benefit from a certain mix of *qualifications for the future*. In this respect, there should be a consideration of whether a mix of intake qualifications should be used. The goal must be to recruit the best students possible. This might mean the brightest minds, but also those least afraid of breaking rules, and the most daring form-makers etc. What are the most important personal qualities of the future architect?

-and of teachers:

No architecture schools are better than the teachers in them. The dependency on the academic staff might make the School vulnerable, but the academics are also carrying the qualities of the system. Is it discussed how to attract, develop and keep the best teachers within the system? This means, for instance, making individual development plans, including advice on research and how to use it in education. The professors in the building design studios have less time to practise as professional architects – for the Masters design studios professional architects should be considered, or models where the two could be combined.

Bachelor level

We observed a strong first three years, where many aspects are covered and thoroughly tested, and with a trained staff. The Bachelor award aspires to cover all basic elements of architecture, from the simplest element to the city.

The first year is, to many, a threshold experience, and perhaps the most important year in terms of values. We would

like to emphasize the importance of a great team of teachers contributing to this year. This is where the very best and most inspiring professors should alternate in opening up the world of architecture for new generations.

Currently the first year seems to be working well, but to be rather traditional. Could it be rethought in terms of the situations found in modern society? The overall development 'from simple to complex' in scale, could perhaps be challenged, as young people today seem to master complexity differently from earlier generations.

There seems to be a great deal of discussion concerning skills and knowledge, whereas values are less spoken of. Is this intended as something to be provided for the more mature students, or is this the wrong impression?

Student feedback, for example after finishing the Bachelor stage, can be an important input into the process of constantly improving the first three years. There is a question of whether this is done systematically, or if it could be done.

The 'Bachelor board' is apparently a very strong and effectively functioning forum for planning education, an idea one would like to see tried out at Masters' level as well.

Masters level

In spite of a range of high quality classes for the last two years of study, these are easier to comment on at a structural level. The Master courses seem to be as chaotic and fragmented as the Bachelor is organized. The courses seem detached, the path through them random, and there seems to be no planned relation between them.

First of all, it is hard to see how students make their choice. One wonders if there could be some kind of student guidance for informed choices. In particular this is important for students from abroad, but also for each student to plan their education based on their individual strengths and possibilities. It is important to retain the freedom of choice, but for some, certain routes through the last two years of study (let us say within urbanism, sustainable developments, or building protection) could be something to be tested.

Secondly, the Masters courses seem extremely different from each other and hard to compare. Some deal with different functional programs, such as complex programs or housing, whereas others seem to deal with a niche aspect of architecture for a full half year. It could be questioned whether some of them have importance for professional

architects at all, and one would ask what the role of those courses is intended to be.

Is this intentional, or is it just a result of professors' preferences? Is it even discussed? Masters courses should obviously be part an overall academic idea of what the education provision should contain.

For Masters courses, criteria for quality should be transparent and known by all students, and the level of quality from course to course should be addressed frequently to ensure that all courses keep up to standards.

Theory Courses

There is an intention that theory is integrated in the design courses at Masters level at NTNU. But it is essential to keep it integrated, but not melted into each other. In general, theory seems to be a little thin, and there is no clear plan for what should be in the education. It seems slightly random what the theory is that each student learns in their last years.

It is also important to focus on how theory informs practice within the study. Could research inform Masters courses in a more interesting way? Could disciplines from other parts of NTNU be integrated to a greater degree?

Master's thesis

There seem to be considerable anxiety in the thesis semester. This is considered a final test, but is not always the most challenging or mature project during the study. To improve this half year, one may wonder if, for some, too much energy is spent on searching for the perfect program or project. Perhaps some tasks or programs could be suggested and prepared by the School?

For students less eager to do a design project, are there alternatives? Is there a sufficient level of guidance?

CONCLUSION AND RECOMMENDATIONS

To attract and develop the best students as well as teachers, are central priorities in a high quality institution.

Whereas the content and structure of the Bachelor courses is being discussed regularly, and thought through, the structure in the Master level seems less addressed. Masters courses vary too much in quality as well as in their thematic content.

The theory elements need focus – how to implement them and what subjects are important.

Challenges for the leadership

- Make sure there are development plans for the academic staff.
- It is probably a painful but necessary job to consider the quality of the Master courses, develop the best ones, and replace or change those which are not up to standard.

Ideas for solutions/methods to develop

- One should discuss whether there is one or several paths to becoming an architect and, if there are several, which ones they are.
- Student intake should be addressed.
- Grades should be addressed.
- The stage between Bachelor and Masters is a critical point in assessing both the study and the student.

7.c. Content

STRENGTHS

NTNU is an architectural education with a very wide approach, a willingness to embrace many areas, and to continue to transform itself. In addition to the more traditional building architecture, there is a strong field of urbanism. At the same time the school is exceptional in the Nordic countries for its 1:1 building studios, or live studios. The duality of a very local, climate specific context and an orientation to the world, is intriguing. So is the stress on interdisciplinary work and group work.

OBSERVATIONS and EVALUATION

What are the potential strengths particular to NTNU?

Knowledge

In terms of knowledge, the School is widely acknowledged for its technical-oriented architectural competence. This may no longer be valid, but would probably be possible to revive, the reputation still being vivid.

Given the position of the School, both geographically in mid-Norway, and as a part of a university focusing on water and energy, one would think there would be a potential for specializing in cold climate energy solution and building

technology. The interdisciplinary weeks within the university seem to have been a success, and could perhaps be developed further.

In the Bachelor curriculum, each course seems to have a thoroughly tested model for what it should contain. This is a positive quality, but might lead to fatigue on the teachers' side, if the same course is given every year. Is a shuffling of the teachers discussed, as well as the theme for the courses?

Theoretical input is addressed by the students as very variable, and sometimes invisible in terms of the theory being swallowed up by the design course. There seem to be a great possibility for improvement of the theoretical aspect, both in terms of the overall plan (what should be addressed) and how to integrate it in the courses. Could researchers have more direct impact on the courses? How does the architectural faculty incorporate and exploit the fact that they are a part of a university with a number of faculties with related knowledge? Who is formulating the big picture of the study's content, and how are curriculum decisions made, both in theory and design courses?

TRANSark as a pedagogic model seems an interesting asset and an important field of consciousness for a part of the academic staff. It seems a little unclear to the Committee exactly how TRANSark is intended to be used, i.e. if it is a tool, a forum, a course or a method. Many resourceful people from the academic staff are involved in this initiative, which is a strength. However, this group might also be hard to oppose to for those who are not buying it as an academic model suitable for their course.

Skills and when to gain them

The live studios (1:1 and hands on) have become a core at NTNU, and are one of the School's unique selling points for international students. The live studios cannot be a substitute for more complex design courses, but as a semester course they are very valuable, comparable to the furniture workshop experience architecture students receive in Copenhagen.

There is also a solid basic traditional architecture education in the school. These courses are popular, and it is important that there are enough of them to make sure that those who want to will be sufficiently trained in design. Is this the case at present?

A practice period/internship is valued both from the student perspective and in the professors' experience, preferably between the Bachelor and Masters stages. It is a question how this can be organized so it will be a possibility for the students who want such an experience.

The tools one needs as an architect are introduced in the Bachelor years. One gets the impression that perhaps not enough emphasis is placed on digital tools – a general, precise drawing tool and 3-D program. To finish five years of education and design buildings in Adobe *Illustrator*, as some students say they do, gives a very unprofessional impression and should not be possible.

Values

Values are quite outspoken, and are one of the aspects that students are proud of. There is a world consciousness, and a belief that one may have an impact as an architect. In this picture is the Master in Sustainable Architecture (which, oddly, has only foreign students and none from NTNU) important? There is also high expertise in relation to third world cities, slums and interest in other parts of the world.

The ideal of team work and design processes in groups, is also strong, in terms of team work rather than hierarchic structure, and a belief in the collective design product. It is important that this way of working is supported by individual projects where each student needs to take responsibility and experience being in charge.

The architect

If one suggests that the products of this education are architects, one could divide them into the following groups:

- The good building architect: There is a strong willingness in NTNU to explore and widen the traditional architecture role. This means that one may educate architects that have other skills than those one is accustomed to. However, 77% of architects from NTNU still get jobs in architects offices, mainly working on building projects. This is also reflected in the Master thesis produced by the School. We recommend keeping the building architect in focus, as the master builder is an increasingly complex and demanding role. This is the core product of the School.

- The global urbanist: NTNU has a very particular position in Norway and perhaps Northern Europe (one they might not be fully aware of) as a very strong urbanistic branch. There are at least three courses doing seemingly high quality ur-

banism projects, most importantly in rather different modes. This is a great strength in a growing field, which seems to fit the values and potential of this university very well, and particularly in terms of global responsibility, team work and transdisciplinary projects. This field is established, and can easily be developed as something that puts NTNU even more clearly on the map.

- The unknown architect: There seems to be a consciousness in the School about the future architect who does not necessarily belong to either of the above groups. It is claimed that 'all architects will not necessarily work in architectural offices', and that the educated architect may have an important role in a variety of society arenas in the future. This may be, but these arenas should be addressed and clarified, as this 'architect for the unknown' might need slightly different skills and experiences than the more traditional architect, instead of being left as a mysterious grey cloud. Where will those areas be? In politics? In real estate? In art?

Stakeholders' view

The evaluation Committee also had interviews with the stakeholders, the consumers of newly educated architects – the offices hiring architects. In general, they felt that many newly educated architects had less experience in building design than they would prefer. However, they all stressed that what they were looking for in new employees, was not that they were familiar with building laws or knew everything about detailing. What the stakeholders were looking for, was a strong belief in architecture and new ideas, conceptual thinking, and the ability to learn.

CONCLUSION AND RECOMMENDATIONS

NTNU is an architecture school with a willingness to change. In its best form, change will be to strengthen the qualities particular to this educational institution, as well as defining new fields of competence and interest.

Special qualities, as the Committee sees it, are the field of urbanism, the Live studio experiences and the tradition of cross-disciplinary work. It is also important to envisage the variations of the future role of the architect as clearly as possible. But the education of the building architect is still the core value in the institution, and must not be undermined. This is in itself a very complex study to cover in five years, and needs focus and care.

There seems to be a great potential in a strengthened theory element. The School should consider integrating research in certain studios, as teamwork between students and researchers in relevant fields.

Challenges for the leadership

The leadership has strong connections to the TRANSark group. This may be a challenge to those who would prefer a different pedagogic path, whose voices should not be silenced. It is important that one is clear about what TRANSark is and its role in the institution. Will 'one size fit all'?

Looking at the numbers, there seems to be a rather large group of academic staff who have taken part in the process and meetings only minimally. Can their concerns and views be addressed, and the content of their role clarified?

Ideas for solutions/methods to develop

The content of the education of an architect is obviously not a one way exercise. It should be developed from within the organisation, but one needs a forum of discussion in which one may suggest what are the existing strengths, which are the new ones to be developed, and which fields of education should no longer have a role in this School.

There seems to be a healthy environment in the Faculty for this kind of discussion, and the process seems to have started.

7.d. Pedagogy

STRENGTHS

The TRANSark project group have identified a set of valuable pedagogical principles that might inform the education of a future generation of architects who, at the same time as being technically, aesthetically and professionally competent, might see beyond bureaucratic and regulatory procedure to address the pressing social, environmental and political challenges of our time.

These principles – eg a deep approach to learning, threshold concepts, active engagement and critical reflection— and imaginative teaching methods such as Live Studio, can form the basis of a distinctive signature pedagogy in Architecture at NTNU which will enable NTNU graduates to make informed evaluative professional aesthetic judgements.

OBSERVATIONS and EVALUATION

An immediate question is whether the 'TRANSark' vision for the future of the architecture curriculum is one that should be adopted across the whole School. Should TRANSark become a strong recognisable new 'signature pedagogy' for NTNU? If so, then it will need to be expanded, clarified and communicated more widely to all teachers and students to create coherence across the programme and 'buy-in' from those participating in the programmes. If not TRANSark, then alternative visions need to be articulated and discussed.

The School should characterise what transformational learning looks like in terms of a) overarching threshold concepts (eg environmental sustainability, tectonics, complexity and depth, the confidence to challenge) and b) the distinctive pedagogies which will most appropriately help students to achieve these threshold understandings (eg 'making is thinking', live studio, site field trips, placements, case analysis). Through these approaches the core architectural **knowledge, skills** and **values** that NTNU students will need in future can be clarified, and also the ways in which evidence of their achievement can be measured (see Section 5 e Assessment below). So:

- At B- and M- levels the conceptual lenses through which architecture is analysed and critiqued need to be made more explicit
- The critical framework needs to integrate theory and practice more coherently and consistently across the programme
- We move away from individual tutors working in conceptually isolated 'silos' across the programme.


The purposes of the programme need to be defined and articulated through course documentation (eg a course handbook) that indicates learning outcomes and shows how these outcomes are aligned with appropriate teaching methods and approaches to assessment.

CONCLUSION AND RECOMMENDATIONS

The course documentation is also the means whereby the knowledge, skills and values to be developed in the programmes can be identified and indicated.

Tolerating risk, uncertainty and occasional failure is a characteristic of the TRANSark approach. Risk often produces generative learning experiences. There is of course an obvi-

Each course might produce an operational matrix to integrate these pedagogical factors, eg:

Name of course: Environmental Sustainability			
Identified Threshold Concept: Thinking sustainably			
	Knowledge	Requisite Skills	Values
	<i>Climate</i>	Emissions calculation & measurement	Environmental and planetary awareness
	Materials	Production cost analysis	Health
	Emissions	Sustainable design	Wellbeing of future generations
Teaching method(s)	Design studio, independent student enquiry, emissions analysis workshops		
Assessment method(s)	Production of a costed sustainable design, to include a theoretical rationale		

ous paradox that attempting to prepare students to address a world of uncertainty, complexity and risk is not best served by introducing a new kind of certainty into the programme through rigidly defined learning outcomes. It should be possible to articulate a distinctive pedagogy in such ways as to define the sorts of architectural challenges and the nature of the learning episodes that students will be required to encounter within the programme, without having to predict in detail the outcomes of such encounters for individual groups of students, and to systematise them. The encounters and learning thresholds can be consistent, the individualised outcomes do not have to be.

What will remain important will be to ensure a balanced and coherent range of pedagogies and teaching methods through the programmes overall. Imaginative encounters with risk and encountering the unknown need to be balanced against the acquisition of necessary technical skill and professional 'know-how'. Making is thinking does not of course imply that students end up unable to articulate, communicate and evaluate their thinking.

Challenges for the leadership

There is a human resource issue in that it became clear in conversations that are insufficient, suitably qualified and well prepared staff to undertake all the teaching options that are required. However good the course design becomes, it needs to be implemented by staff who understand the principles behind the design and who are motivated and sufficiently well informed to implement the design.

There appear to be a focused, committed and enthusiastic core of staff, mainly programme and course leaders, and principally focused around the TRANSark project group, who share a common vision of a new pedagogical approach. This approach needs to be more clearly and emphatically articulated so that it can be communicated and shared with the wider core of teaching staff (many of whom are part-time or casual contributors), in order to bring them into the direction of travel of the transformational learning that is envisaged for the School.

Achieving a balanced and coherent range of pedagogies across the Bachelor's and Master's programmes may require fostering a greater degree of collaboration between B-Level and M-Level teachers, and a reallocation of the mix of teachers between B- and M-Level s. Only having one professor teaching at B-Level does not send a positive signal to students.

The School seems currently based primarily on local themes and forces. Should it think more ambitiously about recruiting into its ranks 'iconic' professors and architects of the calibre, say, of Andrew Freear, Todd Saunders or the Snøhetta Design Agency?

Ideas for solutions/methods to develop

The School's tentative forays into the use of Peer Assisted Learning (PAL), peer mentoring and peer coaching, seems to have led to positive learning experiences for students. This good practice could be capitalized upon and spread across the School. It might also be elaborated into 'vertical projects' across the various years of the B and M-Level programmes, with the projects having a continuing existence with more advanced cohorts of students taking over leadership roles in the project from year to year.

The School may wish to explore greater use of digital pedagogies, with an increased emphasis on 3D visual modelling, and use of modern professional graphic tools. Teacher advisors or Learning Advisors might be a valuable means of assisting students to make informed decisions about their course choices and study direction. NTNU has an excellent existing facility to support future professional development in the areas outlined. This is the Educational Development Centre led by Professor Leif Martin Hokstadt, which could provide an evidence-based approach to assist team development in the areas of pedagogical understanding.

7.e. Assessment and feedback (grading, criteria and feedback)

STRENGTHS

Students and teachers within the School at NTNU characteristically have very open contact, harmonious relationships and work usually in close proximity with each other. Teach-

ing staff and course leaders are easy to approach to arrange either informal or formal consultations.

There is a common purpose and general agreement in broad terms that the explicitly stated goals of the degree programmes are to produce good architecture, socially responsible practising architects of high quality, as well as mature individuals (and future citizens) with critical minds. This sense of a common purpose provides a sound and healthy climate for ongoing discussions as to what constitutes the 'right' kind of architect(s) and how to ensure the development of such architects.

OBSERVATIONS and EVALUATION

A key consideration is the need to recognize that assessment is at the heart learning, and in a well designed curriculum acts as a compass to sound practice. It is a tool for learning as well as a measure of learning. If the course is well aligned (Biggs 1996)¹ assessment should drive and direct student activity. The assessment requirements within each course should align with the intended learning purposes and seek to provide evidence of their achievement. This should apply to theoretical courses as well as the project courses at NTNU. At present the alignment seems to be primarily with the Live Studio projects and insufficiently with the achievement of other areas of architectural *knowledge, skills* and *values*. In a program of professional development learning will inevitably take a spiral form with similar but uniquely different variations and encounters with architectural problems and content at different stages of the programs, in different contexts and with increasing complexity and challenge. The assessment design should reflect this, whilst at the same time seeking to prevent overlap of assessment of similar knowledge, skills and values at the same level in different courses.

A series of questions present themselves in the current mode of operation of the program, and should be addressed by the course team. What are the current criteria for the Masters programs, and for the Masters thesis? Are there minimum criteria, and, if so, what should the minimum criteria include and what level of desired achievement should they signal?

What is the current function of grades within the program? What (beneficial) effect do they currently have? Are they currently evaluating process or product?

¹ Biggs, J.(1996) Enhancing teaching through constructive alignment *Higher Education* 32: 347-364.

Equally important is the question of whether current assessment and feedback practices are constructively aligned with the espoused TRANSark 'vision' of transformational learning. If so how are threshold concepts assessed? How is the necessary range of architectural core *knowledge, skills* and *values* assessed across the program? How might professional impact be measured and evaluated? How are graduate attributes assessed, and how are How are formative feedback and 'feedforward' provided? These elements are not currently sufficiently visible in the course documentation and an overall coherent pattern or mosaic of assesment approaches needs to be indicated in order to match the inevitable variability in student approach found in all courses, as well as the inherent variability across the differing demands and cultures of the many contributing subject areas and disciplines in these interdisciplinary degree programs.

CONCLUSION AND RECOMMENDATIONS

Assessment can and should also be used to indicate the level of any specific part of the program. It should draw

attention to what is important to be attained within a course, be that a process or a product dimension, groupwork or individual endeavour, graduate attributes, an interdisciplinary perspective, an architectural disposition, the attainment or crossing of a critical learning threshold, evidence of technical skill of aesthetic sensibility. The assessment design should not allow students to evade challenging areas of either their own perceived weakness or dislike.

Furthermore creative risk-taking, as discussed earlier in Section 7.d. above, requires assessment to focus not only on the end product but on the process of risk-taking.

Challenges for the leadership

There needs to be a review of who is currently undertaking assessment to determine their values, background and purposes.

The censors need to consider attainment over the whole program and not only within the student projects.

Name of Student:		Course:		Date:
CRITERIA	KNOWLEDGE	SKILLS	VALUES	COMMENTS
At the end of this programmes students will be expected to blah, blah, blah, blah.....	i).....	i).....	i).....
	ii).....	ii).....	ii).....
	iii).....	iii).....	iii).....
	iv).....	iv).....	iv).....
GRADE	A	B-	B+	TOTAL GRADE B+

A minimum level of professional development in principles of effective assessment and feedback practice needs to be organised and undertaken by all those engaged in assessment activity.

Ideas for solutions/methods to develop

The seven principles of effective feedback and assessment practice elaborated by Nicol and MacFarlane-Dick(2006)² could be used as a helpful guide to future practice within the programmes, namely that effective assessment and feedback practice should:

1. Clarify what good performance is
2. Facilitate self assessment
3. Deliver high quality feedback information
4. Encourage teacher and peer dialogue
5. Encourage positive motivation and self-esteem
6. Provide opportunities to close the gap between current achievement and the desired performance
7. Use feedback to improve teaching

If the degree programs at NTNU are to serve as a preparation for future professional practice, as well as an opportunity for imaginative rethinking and critique of conventional practice, then assessment might be used in the same way that professional architects evaluate each others' work, ie through peer critique and review. There is emerging evidence (PEER Project 2012)³ that students who engage in both the providing *and* receiving of feedback ultimately perform at a higher level.

So the existing format of the 'crit' should be reviewed, to include an element of peer critique, and also to discourage the practice whereby censors occasionally humiliate and publicly 'trash' the work of students in order to display their own authority.

The use of a feedback proforma which might draw attention to performance in knowledge, skills and values, and which can indicate means to improve future performance is recommended. A structure similar to the following might be employed:

Furthermore a proforma of this type could also be used by the individual student concerned, *prior* to submission of their assignment, as a means of *self-assessment*. It could serve equally well as a tool for students to provide *peer review and feedback* to each other, perhaps operating in triads, with

each member of the triad providing feedback to the two others and receiving feedback from two peers in return.

As noted earlier in Section 7.d. on Pedagogy, NTNU has an excellent existing facility to support future professional development in relation to assessment and feedback. This is the Educational Development Centre led by Professor Leif Martin Hokstadt, which could provide an evidence-based approach to assist team development in the areas of assessment and feedback practice.

7.f. International Program in Sustainable Architecture

Architecture and planning has for a number of years been focused on sustainability. It has gone from being a 'different kind of architecture' in the 80's and early 90's, to now being fully integrated. It is no longer an area of knowledge for those especially interested in the topic, but embedded in architecture and planning. Scandinavia has a special focus on the matter and NTNU is considered to be a spearhead within the topic. The students of the program consider sustainability to be 'the knowledge for the future'.

STRENGTHS

- Attracting global students with global knowledge – students as resources
- A 'new' program – the possibility of defining what people with a Master of Science in Sustainability should be able to contribute
- Interdisciplinary knowledge and research of international quality available (for example ZEB)

OBSERVATION and EVALUATION

In relation to their academic background and nationality the students of the program vary from class to class. There are only a few students attending the Masters in Sustainable Architecture program from the architecture program. Most of the students come from abroad with backgrounds other than architecture and they have different backgrounds academically. They have different roles coming into the program and they want to 'do different things' when they finish the program. This makes the students a very diverse group.

² Nicol, D. and MacFarlane-Dick, D. (2006) Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education* Vol 31(2), 199-218

³ <http://www.reap.ac.uk/PEER.aspx>

When the students graduate the degree they are given is 'Master of Science in Sustainability' – not architecture.

The students have a hard time communicating and clearly defining what their capabilities are for their future employers and the 'market'. Their role and contribution in, for example, architecture offices or engineering firms are hard to define. This must be considered a weakness, but could also be turned around to huge advantage as this 'role' still is in the making.

The program runs over three semesters and the collection of courses and the academic content seem, to the students, to be random, while the overall program is fixed. The assignments given are architectural assignments or projects. Coming into the program with a different background than architecture (e.g. engineering) there is a question how much design should be included in the program. Some of the students with limited experience or background from architecture would like more design and architecture. Others would like more focus on, for example, tools or calculations. This depends on the students included in the program.

The students being such a diverse group are not exploited properly. Many of them have a degree from related subjects and their knowledge could be incorporated into the academic content. The nature of sustainability is interdisciplinary including a number of professions and roles at the same time. The students would like the interdisciplinary work to be more structured than it is at present, both internally within the program, but also externally. NTNU has the knowledge and capacity to educate students within a wide range of relevant professions. But the interaction and potential from this is not taken advantage of in the Master of Sustainable Architecture program. The interaction with research – for example Zero Emission Building, and professionals / firms -- is minimal at present. The students would like this incorporated in the program.

Many of the critiques brought into the program are from architects. The critique is, not surprisingly, then based on architectural perspectives. This means that the evaluation is given as if the student projects are architectural projects. One comment was that 'The critics don't really understand the sustainability thinking and concepts' in the projects. The evaluation then loses value.

The Master program is very people-dependent both academically and administratively. The students really find Luca helpful both in terms of administrative and academic issues.

But he has too many things to do. This is a leadership challenge and should be resolved.

CONCLUSION AND RECOMMENDATIONS

To make the Master of Sustainable Architecture program more distinct and more coherent the following points are recommended:

- Clarify what the outcome of the program is. Both formally, what kind of degree it is, but also the contribution of the graduates to the profession.
- The students with global backgrounds should be reflected and exploited in the content of the course.
- Making the program more independent of people (Luca) both academically and administratively.
- Work out a more rationalized program and courses. This could perhaps be based on steps or phases. Making it more predictable, but at the same time more flexible.
- Structure and strengthen the interdisciplinary work

7.g. Physical learning environment

One could take it as a given that the physical environment in an architecture school is of some importance. The status of the physical environment at present is that there are some impressive workshops, but apart from that, there are some rather messy and disorganized work spaces, a general lack of flexibility and lack possibility to change. Few spaces (if any) can be called inspiring or beautiful. This seems hardly a question of cost, but rather an inability to take action.

To be denied influence over your space, is harsh. To accept this, seems somewhat impotent.

This is more than just a question of the learning environment. It is as if there are a few lessons one would not like to teach students, such as that when it is really hard to get something through, you might as well give up. Or that it is ok not to have an impact, or even that space doesn't really matter.

Challenges for the leadership

Take hold of the spaces the architecture School needs and deserves. Insist on the importance of developing them and show the University how it should be done.

7.h. Student perspective/role

This section will reiterate many of the issues presented in all the other sections. However, the Committee thought that it is useful and important to draw together a picture from the student perspective. In this section there are views that came up in different interviews and in the student workshop. It has to be noted that the Committee did not make any evaluation of the *result* of student learning or students' design projects.

STRENGTHS

Overall the students were very satisfied with their studies, enthusiastic and open to discussing the School. They provided critical comments in a mature and well argued manner. They seemed to be very committed to their studies.

Students valued the rich variety of different approaches and course content; e.g. from 1:1 to urban scale, technical knowledge, aesthetics and art, travelling/field trips, diversity of projects, teamwork. Especially in the beginning of their studies 1:1 working seemed to be of high importance to student learning and experience.

The experience of students was summarised by one student who observed: 'every day is different'.

Students appreciated the possibility of working at the School in studios where they were able to see other students working and to have discussions with their peers.

Students were happy with the contact they had with the teaching staff. Teachers are always available, it is easy to approach teachers and there is a daily contact with them.

Students seem to value very highly the teachers and their aspiration to improve the School and its educational provision. Students felt that their feedback to the teachers was heard and taken seriously. Students also felt that the teachers give value to the students. We saw profound mutual appreciation and that is a fundamental strength of the school.

OBSERVATIONS and EVALUATION

The Architectural profession and the competence needed

The school does not want to limit students understanding of what kind of architects they will be. There is much discussion about the values and roles that an architect can have

apart from the traditional practising architect. In the Masters program the course offering supports this heterogeneous view. However, there is no discussion about what the skills and competencies are that one needs if one wants to become a practising architect.

During compulsory internships students can get an idea about the real work of a practising architect. The School does not assist students in finding an architectural office and there is no supervising of how they could most benefit from the internship. After the internship there is no guided reflection or discussions about the training, what was learned, and what each student would like to learn more.

Students expressed a wish to learn more of the skills a practising architect needs:

- technical drawing, how to draw plan, section, etc
- project management
- economic understanding and business skills
- team working skills
- computer skills and digital competence
- Norwegian building regulations
- the sustainability aspect of architectural design

Students commented that during their studies they do not have an opportunity to get guidance to understand how to communicate what they can do or what they know. Students thought that it could be useful to have practice on how to advertize and sell what they are good at.

Curriculum structure, choosing the courses and study path

In the Masters program students can choose courses freely. After the fixed program of Bachelor level (NTNU) this freedom gives students opportunity to focus on what they find interesting. Before a student chooses a course to take, there is a meeting when courses are presented to students. However, presentations are short and vary in terms of information content. Students pointed out that there is not enough oral or written knowledge to make an informed choice. Not all the courses that were presented actually materialized owing to the lack of interest of students. According to the students, the quality of the courses can differ considerably. And since the choice of the course in many cases is more or less 'random', students felt that there is a luck factor in choosing the course: 'you can be lucky or unlucky'.

Masters students expressed their wish to have the opportunity to choose some courses from other disciplines in NTNU. They felt that the architectural School is rather separated from the rest of NTNU and there is no information on the course offerings of other faculties. Not all the students have opportunity to work in interdisciplinary courses, teams or learning environments during their studies. Students mentioned that most of the teachers are architects, there are very few guest lecturers or censors from other disciplines or professions.

Masters students do not seem to have any clear idea of what courses or course combinations they should choose, in order to achieve certain kind of competences at the end of their studies. In the students' view the courses are not related and there is no aim on the part of the School to support students to integrate what they have learned. In the Bachelors program the sixth course in the last term is a kind of 'capstone' course summarizing and integrating all that has been learned during the program. In the Masters program this kind of possibility to reflect on and to get support for the integration is not provided.

One student summarized the views of others well: 'To have freedom is good. But to have only freedom is not good.'

Follow up and guidance

During Bachelor studies the curriculum structure directs the students and there is no need to give guidance for choosing the courses. In the Masters program the curriculum structure gives unlimited possibilities to choose and gives students responsibility to direct their studies.

Students seem to have very good contact and opportunities for discussion with their teachers. Some students use this opportunity to discuss issues other than those related only to the course and/or project. However, it became obvious that there is no systematic guidance for students related to their studies, learning skills, development of their competences (eg career planning) and for choosing courses at Masters level. There is no follow up or guidance for student progress and professional growth.

Some students were comfortable with the freedom and lack of guidance. However there seem to be students who thought, as one student put it, that: 'Bachelor studies are really good but in the Masters there is a lack of direction and you are left alone.'

Design (practical assignments) and theory (knowledge)

In the Bachelor program some theory is taught. Students commented that it does not seem to be so important and 'you don't take it so seriously – you just study for the exam'.

The Masters program consists of design and a related theory element (a course? a module?). The idea is that a theory course will support working on design assignment. However, student interviews brought up some major problems:

- In some cases there is no connection between design and the theory part of the course. Theory seems irrelevant, totally separate or not useful for the design task.
- In some courses theoretical input has been weak and students were not able to get enough new information or widen their knowledge about the theme. Students felt eager to have more knowledge.
- Sometimes theory lectures consist more of 'slide shows' than academic content
- The pedagogical methods used are often reminiscent of a monologue i.e. a one-directional flow of information. Active learning methods are not commonly used.
- In some courses the promised theory part is not organized at all.
- Many students wished to have more theory of Art, Architecture and Aesthetics

International students and internationalization

There are some interesting courses at Masters level that offer assignments abroad. There are also international field trips and students seem to assign considerable value to those. International students bring a global perspective to education. That perspective is not used as much and as systematically as it could be. Some international students felt that the School is very local and focuses only on the Norwegian context or represents a Eurocentric view. Students pointed out that because the world is global and the profession is international, it could be useful to have a basic understanding of different climatic conditions and their effect on designing architecture.

Assessment of learning and feedback

Students were critical of the grading of projects. They felt that grades determine their learning and make them concentrate on the final project and presentation instead of on the learning process. It was unclear for the students how

the grades of the project were decided i.e. the criteria were not known during the course and after getting the grade. Students commented that they do not get enough (or sometimes any) feedback on their learning process.

Self-reflection and peer assessment were used very little.

In the critics external sensors were often used. In many cases it works but there are also some problems such as situations where students might even become the target of 'mocking or humiliation'. External sensors are not interested in discussing the learning process itself.

Giving feedback to teachers and participating in educational development

Students mostly felt that there are some possibilities to give feedback to the teachers and that teachers take it seriously. However, the Committee formed the impression that this is teacher-dependent and that the students voice is not always heard. Some teachers are very welcoming to all the suggestions for improvements, but not all the teachers are easy to approach with such wishes.

Students were not systematically used as a resource for educational development.

Spaces and the physical learning environment

Students were happy that they had studio facilities and that they could work at the University. It is very useful to work with other students and to have the possibility to discuss with them. Some students had to move their location many times and that created inconvenience as well as a feeling that students were not appreciated. Students also mentioned that the air quality could be better. A wish for better exhibition spaces was brought up.

RECOMMENDATIONS

Guidance

The Committee's view is that it is important that students have the opportunity to get guidance throughout their studies.

At the moment students need more advice on choosing their courses at Masters level, since at present the curriculum structure is fragmented. When the structure will be worked on and communicated to students, this confusion can be minimized. The load for guiding each individual student can be lighter if choices can be discussed with a group of stu-

dents. That will help to allocate guidance resources to only those students with a special need for support.

There are also other needs for guidance, eg.:

- to support students to reflect on their learning process, and progress,
- the integration of courses and what has been learned (e.g. through a portfolio and its analysis in learning terms)
- to reflect on experiences of internship,
- career planning,
- practising communicating the competences that students have achieved and what they still want/need to learn

In the light of resourcing the guidance system, it is important (a) to develop methods that will cover many different guidance aspects and (b) to utilise self-reflection and discussions with peers.

This kind of holistic and wide ranging guidance system will not only support student progress, well-being and achieving maximum benefits from their education, but also provide a considerable amount of information to the teachers and leaders in relation to, for example:

- student progress
- the identification of possible difficulties at an early stage
- Contexts of Enhancement (Land & Gordon 2013) factors affecting student progress and emerging difficulties
- the quality of teaching
- points for improvement (structures, methods, communication, roles, etc)
- the development ideas

Student role

Students emphasized that the teachers and leaders appreciate and listen to them. Nevertheless, the role of students as active participants and change agents could be improved in several ways e.g.:

- in supporting more students to engage in self-reflection
- to use more 'peer power'. Students have expertise that they could share with other students through peer reflection/assessment, peer coaching, etc
- students could have a more active role as educational developers – not only asking them for feedback about the teaching but engaging them in providing ideas to improve the School

All in all students could be seen more as 'assets' than targets of education. That would provide a valuable resource to the School and also strengthen their agency and self-confidence as actors in the community. This would be in line with the aim of educating architects who can have impact and make a difference.

Assessment

From the student perspective the assessment of learning, grading and crits were very much criticised. This issue has been discussed in detail in section 5.e.

7.i. Leadership

STRENGTHS

There is an noticeable atmosphere of trust and co-operation within the School between colleagues, and between staff and students. The climate of openness extends to visitors and 'outsiders' to the institution.

The School has an existing high reputation, nationally and internationally as a strong basis for future development.

OBSERVATIONS and EVALUATION

Governance

From an external vantage point it is not always easy to discern the pattern of decision making and how leadership roles and responsibilities are currently allocated. It is often observed, for example, that when implementing organizational change three modes of leadership are essential. A 'vision' mode, a 'political fixer' mode and a day-to-day 'managing the shop' mode. It is also commonly noted that a single person can rarely handle all three modes. Would such modes be currently transparent within the School?

Implementation of Curriculum Change

Questions then arise about implementation of curriculum change. How might the leadership-level curriculum vision (ie TRANSark Plus) be transmitted to teachers' practice? The levers of curriculum change can be somewhat 'rubbery' and it is a well known phenomenon that 'street level bureaucrats' (Lipsky 1980)⁴ – in this instance the classroom level teachers – have to have a level of discretionary decision-making power delegated to them in order to make policy work at the front-line. This also passes a degree of risk to them, but of course the leaders/ policy makers also incur risk in the implementation in that they cannot maintain finger-tip control of the process and policy priorities may be 'judiciously subverted' (or occasionally improved!) as they pass down the School. Reynolds and Saunders (1985, p. 200)⁵ characterise policy operation as an 'implementation staircase' at the various levels of which the original policy purposes undergo treatment – modification or differing degrees of transformation – at the hands of different interested parties. Trowler (2002)⁶ describes how implementation usually encounters local 'resistance and reconstruction', as a result of signs being read in different ways and hence readings becoming difficult to predict. Ball (2006 [1998], p. 75)⁷ suggests that 'most policies are ramshackle, compromise, hit-and-miss affairs, that are reworked, tinkered with, nuanced, and inflected through complex processes of influence, text production, dissemination and ultimately recreation in contexts of practice'. Intentions and practices can change in this mutually adaptive process, and usually at the local level. How then, will the leadership team in the School seek to keep a level of consistency in the implementation of the vision as each interested party on the 'staircase' adjusts the visionary intention? How can the team build and expand the collective base of knowledge to increase its ownership across the School (perhaps akin to the Snøhetta design brand approach to collective ownership?) and particularly amongst part-time and casually employed staff whose professional identity is not necessarily always primarily academic. This would seem to require a set of methods

⁴ Lipsky, M. (1980) *Street-Level Bureaucracy: Dilemmas of the individual in public services*. New York: Russell Sage Foundation.

⁵ Reynolds, J. and Saunders, M. (1985). Teacher responses to curriculum policy: Beyond the 'delivery' metaphor. In J. Calderhead (Ed.) *Exploring Teachers' Thinking* (pp. 195–214). London: Cassell.

⁶ Trowler, P. (2002) The nature of things: change and social reality. Paper presented at the 3rd Education Doctorate Colloquium, *Managing Educational Change*, 4 April. Edinburgh: University of Edinburgh.

⁷ Ball, S. J. (2006). Big policies/small world: An introduction to international perspectives in education policy. In *Education Policy and Social Class: The Selected Works of Stephen J. Ball* (pp. 67–78). London: Routledge.

Eg NTNU ↔ Faculty of Architecture and Fine Art ↔ Employer ↔ Student

and measures to lift collaboration from the personal to the structural level? What plans for Continuing Professional Development (CPD) might be put into place, and who will lead and deliver them? More particularly are the models of creativity, School direction etc which have been presented to the Committee during previous visits intended to be communicated widely across all staff? How will the vision be shared with other important constituencies?

Staffing

A discernible potential risk lies in the current pattern of staffing. There appears to be a shortage of tenured staff which may explain effects such as there being only one professor available (or wishing) to teach at Bachelor Level. Staff at Bachelor Level do not appear to be particularly well cared for, with unintended consequences that some are exhausted after a few years. This then gives rise to a major risk of being unable to ensure knowledge continuity. The current *modus operandi* appears to be very people-dependent (ie knowledge contained within people's heads) and insufficiently system-dependent (with knowledge documented, transparent and accessible).

Quality enhancement

It is not easy to discern, again from an external vantage point, how quality is assured and, going forward, enhanced. What formal measures are in place to support these processes and where are they documented? For example how does the School monitor student progress, and follow up on students' employability destinations? How (and why) are new courses developed and what is the process of their approval? Is there (should there be) a Board of Masters Education? How are the best students attracted and selected, other than by mere grade attainment and the popularity of Trondheim as a town with an attractive student lifestyle? Is it, for example, optimal to give students admission from grades only, or should there be an entrance examination? In short, how does the School make sure that it is recruiting the right kind of student, and how has it defined 'right'?

As a matter of both quality assurance and quality enhancement, how does the School evaluate its provision? How does it evaluate what works? What sources of feedback are available and utilised, eg How is feedback obtained from

students? How content are the architectural offices with NTNU graduates, and what is the subsequent quality of the structures designed and built NTNU architects? How does the School determine that it is educating the right kind of architects, and what measures of social impact are taken into account in this consideration? What is the quality of an NTNU Diploma, and how is this warranted? Is there for example an Exhibition Yearbook, displaying the School's body of work and rendering it publicly accessible? What opportunities realistically exist for improving the physical teaching environment and its available equipment?

Vulnerability of courses and potential contexts of enhancement

Courses under present arrangements appear to be highly dependent on particular members of staff and their inherent expertise. This presents an obvious risk for 'future-proofing' provision. The presentation of courses and the process of student selection by a kind of 'public hustings' approach would seem to be less than desirable. Although there are clear benefits for courses meeting students' interests, an entirely consumer-driven programme would seem to render the programme's minimum requirements less important. This raises a set of interesting choices for the leadership in terms of how it will seek to enhance quality in terms of 1) a high fidelity mode (with the priority on consistency to a set of principles and standards), 2) a low fidelity mode (with greater latitude allowed according to local contexts), 3) a consumerist approach (based on student satisfaction) or 4) a managerialist approach (where efficient resourcing is key). We might represent these choices diagrammatically as follows:

Organisation and Coordination

The scheduling of classes needs to be revisited to overcome the possibility of the overlap between studios and courses. The 'marketing' of courses, with teachers presenting the courses and hoping for 'votes' involves unnecessary work for teachers and some courses (perhaps important ones) might not be realised.

Context	Informing notion	Idea of quality	Gains	Risks	Trust
High Fidelity	convergence, and alignment	consistency, conformity to standard	coherence, consistency and reliability	stifles innovation, insufficiently context-sensitive, tokenism, compliance	low trust of variation
Low Fidelity	importance of context, tolerance of variation	engagement, innovation, variation	taps into how architects prefer to work, fosters motivation, sense of ownership, relevance	restricted to specific pockets, practice fragmented	high trust of local practice
Managerial	effective resource deployment, 'joined-upness'	transformed practice	better matching of resources to strategies, greater efficiencies	resistance, conflict, 'noise', non-compliance, judicious subversion	low trust of local practice
Consumerist	market competitiveness, institutional positioning, strong brand, competition	fitness for purpose, value for money, excellence	student-centred provision, consumer satisfaction, improvement of student learning	distortion by the market, stifling of innovation, reputational damage	high trust of the market

Contexts of Enhancement (Land & Gordon 2013)

Research

It is not currently clear how the School's teaching provision is complemented by staff research interest and by PhD research. To what extent might the School's provision be deemed 'Research-led'? Do the research interests of teachers enrich the programme design in an informed and strategic fashion or are they somewhat idiosyncratic and perhaps distort the programme into unintended directions? How can staff research and supervised doctoral research within the School be used as strategic tool for future programme development, eg with research topics being offered as strategic student choices as opposed to a professor-led (ie provider led) choice of research topics)

How would the School characterise its Research-Teaching-nexus. Are students de facto passive consumers of professorial research or more like co-enquirers and co-producers of architectural knowledge? How and where is this nexus communicated within and outside of the School?

Staff recruitment and training

How are teaching staff recruited and trained in the School? Is there a prevailing assumption that good architects will automatically translate into good teachers. How are new teaching staff (including part-time or casually appointed adjunct staff) inducted into the NTNU philosophy or vision? What model of quality assurance exists here, with some staff described as recruited occasionally 'from the 'streets'? Should there be a minimum required level of professional development in architectural pedagogy for all staff, and ongoing CPD for those who wish to pursue architectural education further?

CONCLUSION AND RECOMMENDATIONS

There is a need for more systematic approaches to quality assurance (QA) and quality enhancement (QE). Current approaches seem somewhat sporadic and informal.

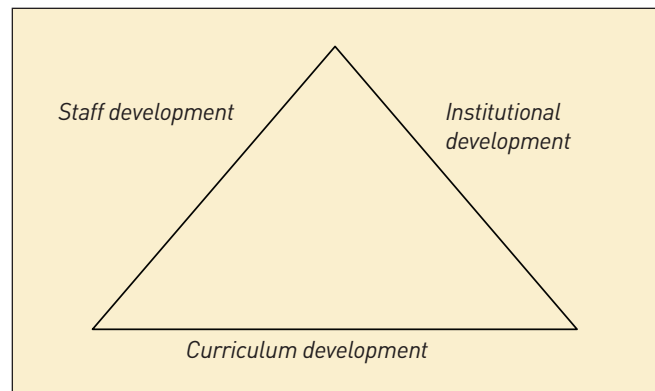
There is a need to keep a School Risk Register to monitor 'countdown factors' (ie perceptible, predictable risks) and 'blow up factors' less perceptible risk factors but with potentially catastrophic effects.

Research agendas need to be harmonised with the needs of degree programmes, and research used as a strategic tool for development.

There is a need for more helpful and explicit course documentation.

A more considered approach needs to be taken to staffing issues of recruitment, selection, welfare, workload and training.

The following model may help to indicate the interrelatedness of all developmental policy initiatives, whereby intervention on any one of the sides (elements) of the triangle will have a corresponding effect on the two other sides (elements).





8. Attachments

Attachment 1

Introduction to the committee

Anu Yanar

Development Director MSci(Arch) PhD, MAFY-valmennus, Finland (Chairman of the Committee)

- Educational leadership and enhancement of educational development
- Quality systems and evaluation of degree programmes in higher education
- Higher education pedagogy and curriculum design process
- Pedagogical training for higher education teachers
- Architectural design studio pedagogy (PhD research)

Tor Inge Hjemdal

Architectural manager MSci(Arch), National Association of Norwegian Architects, Norway and Founding partner at CONDITIONS.

- Experience from and broad knowledge about practice, organization and governmental level of architecture in Norway.
- Responsible for developing the architectural strategy, project development, architectural counseling, educational post master programs and governmental dialogue for the National Association

Ray Land

Professor of Higher Education, Durham University, U.K

- Curriculum Design
- Theories of Learning and Teaching
- Assessment and Feedback
- Quality Evaluation
- Threshold Concepts
- Higher education pedagogies, digital pedagogies

Tanja Lie

Architect, Lie Oyen arkitekter, Norway

- Runs a practice with four rather newly educated architects from various educational backgrounds
- Four year diploma sensor in the Oslo School of Architecture, four years for NTNU
- Familiar with various studios in the Oslo School as a guest teacher
- Interested in the students' abilities and tools for learning and practising by the end of their study

Emily-Claire Nordang

Master of Architecture / Bachelor architecture student, Chalmers Technical University, Sweden (current student in NTNU Master of Architecture program, participated in Committee working starting from the 2nd visit)

- As a student I can directly relate to student issues such as
- I would like to make sure that student point of view are discussed and also bring in my experiences from my home university.

Agustin Ruvira

Master of Architecture student, UBA-University of Buenos Aires, Argentina (current student in NTNU Master of Architecture program, participated in Committee working starting from the 2nd visit)

- Being asked to participate in this assignment as being a student representative with a foreign view I want to try to approach the task with a critical eye from a student's perspective on a global scale. The idea is to focus on working for the students' needs and the quality of their education.

Norbert Fisch, *Prof. Dr. Eng. Head of Institute, Vice dean, University Braunschweig, Department Architecture and Institute for Solar Technology and Building Engineering (IGS), Germany. (participated 1st visit and discussions after)*

- For 20 years has been professor at the University in the Department of Architecture
- 2 years dean and 2 years vice dean – updating of Bachelor and Masters curricula acc. Bologna
- Incorporated the Masters in 'Sustainable design' in 2012 at the Department of Architecture
- Participation in two accreditation procedures of Masters courses in the Department of Architecture

Line Pedersen, *Master of Arts in Architecture / Cand.arch, Aarhus Arkitektskole, Denmark.*

Architect MAA at E+N Arkitektur A/S (participated 1st visit)

- Since I initially was invited to this assignment as being a student representative I believe that it is my primary task to undertake the students' point of view. I will focus on always having the students in mind since it is them and the framework of their studies that we are working for.

Attachment 2

Detailed programs of the visits

1st committee visit 26.-27.1.2015

Monday 26th

09.15-10.00	Introduction / Individual presentation / Framing the work.
10.00-10.30	DISCUSSION - A shared discussion for developing a good process and product
10.30-11.15	PRESENTATION - Brief presentation of the two programs and their main challenges
11.15-12.00	TOUR through the studios and the physical facilities of the faculty.
12.00-13.00	Lunch
13.00-14.30	SHARED MEETING. Everybody involved in the two programs (teachers, students, admin., leaders, etc.)
14.30-15.00	Coffee break
15.00-16.00	PRESENTATION. Course presentation. 2 year master in sustainable architecture
16.00-16.30	PRESENTATION AAR4365 ARK 5 Markus Schwai
16.30-18.00	Break
18.00-19.00	Committee meeting
19.00-21.00	Dinner

Tuesday 27th

Course presentation. 5 year master in architecture:

08.15-11.00	PRESENTATION Bachelor level. Individual meetings with course managers/reference group. Ark 1/Ark 2/Ark 3/Ark 4 /Ark 6 6x25 min
11.00-12.00	PRESENTATION ATH/Structural knowledge/Building Physics/Form & Colour 4x15 min
12.00-13.00	Lunch
13.00-16.00	PRESENTATION Master level. Individual meetings with course managers/ref. group Design courses 22x5 min
16.00-17.00	Committee meeting

2nd committee visit 16.-17.3.2015*Monday 6th*

9.00-9.50	INTERVIEW : Bachelor-level (5-6 students) Group interview:-students at the bachelor level from 1st ,2nd ,and 3rd year
10.00-10.50	INTERVIEW : Master-level (6 students) – group interview
11.00-11.50	INTERVIEW : Master in Sustainability (5-6 students) - group interview
11.50-13	Lunch (committee meeting)
13.00-15.00	Two parallel programmes A and B: A: INDEPTH INTERVIEWS: Two students at the time. Each interview will take 20 minutes and then committee will have 10 minutes reflection after each interview. B: WORKSHOP: Workshop for 45 students (15 students from each program: B-level, M-level and M-Sustainability-students)
15.00-15.20	Break and committee discussion
15.20-16.10	INTERVIEW : Bachelor teachers –course leaders
16.10-17.00	INTERVIEW : Master teachers – course leaders
17.00- 18.00	The students launch a New issue of the student-magazine ('A') With focus on the evaluation-process.
18.00	Dinner
19.00-23.00	Committee meeting

Tuesday 17th

8.30-9.30	INTERVIEW : Interviews of teachers other than course leaders (B, M, M-Sust)
9.40-10.30	INTERVIEW: stakeholders (5).
10.45-11.45	INTERVIEW and DISCUSSION -program leaders, vice dean and dean
11.45-13.15	ROCESS MEETING to plan next visit program (Committee together with leaders)
14.00-16.00	Committee work

3rd committee visit 12.-13.5.2015*Tuesday 12th*

9.00-9.30	MEETING - Committee and the program leaders (short exchange of news)
9.30 -11.30	WORKSHOP for the teachers and students (20 teachers and 10 students)
12.00-13.00	Lunch
13.30- 18.00	Committee work for the final concrete suggestions (at the Hotel)
19.00	Dinner with Bjorn et al (Bakgården in Kjøpmannsgata 40)

Wednesdays 13th

8.30-11.00	MEETING Working with the leaders
11.00-13.00	Committee meeting and lunch
13.15-15.00	SEMINAR for all the staff and students

Attachment 3

Student workshop 2nd visit 6th of March

The workshop held was structured in the following way:

Phase 1: Students were asked to write on the poster WHAT KNOWLEDGE, SKILLS and VALUES FUTURE ARCHITECTS NEED.

Phase 2: Students were asked to suggest HOW EDUCATION CAN SUPPORT LEARNING of those things they wrote on the poster.

Phase 3: Students were asked TO EVALUATE THEIR EDUCATION AND PROGRAMS and to write on green post-its the strengths (+) and red post-its for weaknesses/needing improvement (-).

Phase 4: Students were asked to write on yellow post-its some IDEAS FOR DEVELOPMENT ideas for development of education.

The results of the Phases 1-3 have been compiled together in the matrix below. After that there is a list of students ideas for developing today's architectural education at NTNU.

The colour coordination of the results below indicates the background of each focus group in following way:

- The results written in black are mostly from the bachelor level but contain general reflections that came up in each focus group.
- Blue text indicated comments specifically from master students (MA).
- Green text indicated comments specifically from students from the sustainability master (MSci).

KNOWLEDGE	How to get there?	Evaluate your education +/-
Construction	Building practice Workshops Case studies	+ NTNU has a lot of focus on field trips and case studies, but even more would be beneficial.
Materials	Material library Building practice Case studies Internship	+Whole semester of tectonic building in first year + Visit to cement factory - No company presentations - No relationship with building companies and material producers
Architecture Theories: history, economy, politics, geography	Reading Lectures Essay writing Excursions Debating Discussions Case studies Using history in design process	+ Case studies are great +Traveling is very educational - Follow-ups on essay writing and readings is rare. - The theories are not taken seriously
Anthropology & User needs	Self and user reflection Interviews with different types of people & clients	- Too much of an 'architecture bubble'. NTNU focus more on assuming what people think and want rather than interviewing and finding out the reality.
Economic references	Case studies Calculating costs	- Basic economic understanding is missing
Sustainability - Climate	Discussion – even with non-architects Looking back at history Lectures based on experience Workshops Interaction with society through internships and community service	- Interdisciplinary work (to learn from other fields) is non-existent - No interaction with professionals
Space quality & scale	Space and room experimentation Measuring and understanding size Building models	+ Roomlab & Daylab + Techtonics in Ark3 – discussions and reflections on what makes a good space - Should be more clear about what makes something a good/bad space -Roomlab & Daylab should be available to all year students -Space studies not integrated into the curriculum and must be done by own initiative (particularly scale 1:1)
Real world understanding	Real life projects	- Could be more challenging and realistic

Regulations	Books/Internet reading Test our projects Learn how to implement into design process Make a course about laws and regulations	- No access to Norwegian standards of building - Very little talk about regulations
Building techniques	Reading Lectures Testing and experimenting Internships	-NTNU demands 7 weeks of internship during the degree but gives few opportunities to do it, so students have to take initiative and do it during their summer break.
Building physics	Theory Lectures – guest lectures Site visits	+ Good courses - Lectures are too technical, should be expressed more simply - Knowledge limited to Norwegian examples - should integrate more international knowledge
Architectural Design- Basics of urban planning and landscaping	Learning step by step Teachers with different backgrounds and methods	- Teachers not always available - Teachers mostly architects - Lack of pedagogical attitude
Time and architecture	Understanding the use of a building throughout time and how the uses might change – books, lectures, case studies	
SKILLS	How to get there?	Evaluate your education +/-
Method of process	Specific projects with different approaches Stepping out of your comfort zone	+ Several assignments during the course
Cooperation	Teamwork Delegation Learning about different roles in a team Different kinds of teamwork Groups with different year students (1 st , 2 nd , 3 rd , master level)	+Working in groups + Experts in Team is good but should come in even earlier -No guidance on group cooperation - Interdisciplinary work non-existent - Allows people to hide behind others, lack or motivation - Don't learn about different roles in a team

Reflection	Discussions	+Engaged students, good environment -Little reflection on our own learning
Creativity	Workshops Experience	+ Diversity of projects
Problem solving	Be challenged	
Communication/Prese ntation	Practice- oral, visual, written Informal presentations to build confidence	+ Lots of teamwork and guidance + Encouragement to ask peers for help + Layout guidance with Jostein - Need more computer program skills/guidance - Guidance in selection of drawings for presentations
Dedication	Social environment that encourages	+ Sitting in studios – being surrounded by other students
Precision	Practice	
Craftsmanship – Model making	1:1 practice Technical tutoring Guidance on workshop tools from day 1	+ Building pavilion in 1 st year + Wood workshop is great + Different courses focus on different model techniques
Computing skills	Masters students – group workshops Learning the program as an actual subject Practice	+ Sustainability students had guidance with exercises included within the course. - Lack of formal guidance - Hard to find the time
Technical drawing	Repetition Working with artists	- Lacking amount of practice and guidance -No general introductions to technical drawings - Different ways of representation (both technical and arty aspects) - Learning the rulers should be in Ark 1, not Ark 4

Selling	Presentation skills and technique	- Presentation skills should be taught - Guidance in how to present for other people and clients rather than critics
Patience	Group work	+ Placement in group and coaching
Research	Library guidance	- Lack of guidance regarding research methodologies
Analysis	Case studies Practice	
Simulation Tools	Practice – try it out, experiment.	- Should allow doing things by yourself
Planning and management		
Calculations – Energy, CO2		
Photography	Model photography Learning basic photography principles Practice	+ Photo course in 1 st year - Photo studio lacks proper equipment
Writing	Express yourself through writing Reflecting on subjects	+ There is a methods course essay + 2 nd year Tectonics assignment - Should be more writing
Being able to adapt	Being flexible	

	Open for new things	
Project Management	Work experience Theory Being part of a project from start to end	- Not all students are able to get work experience

DEVELOPMENT IDEAS

- Integrate the education in technical skills like BIM modelling in courses. This must be done at the right time with relevance to the current studio work. Quick mandatory tasks could be one solution.
- More cooperation between the technical/theoretical subjects and the studio work.
- Smaller tasks for learning of theory and 7.5pt courses throughout the studies.
- NTNU can help provide placements for the compulsory internships and encourage employers to give the students an active role in the office with varied duties and types of work.
- Organized site visits to building sites, visits to companies.
- Sustainability should be integrated into the studio work more often rather than only in seminars.
- Remove grades from courses.
- Forced reflection from day 1 (what does architecture mean to you?)
- Clearer relationship between the Ark1 through Ark 6 courses and clear development for students to see. This can be done through reflection and evaluation post courses.
- NTNU could expand the form & colour subject to learn about more theory about aesthetics.
- More interdisciplinary subjects/projects.
- More local fieldtrips (firms, factories and buildings).
- Travel to not only beautiful sites and good architecture, but learn from the mistakes of other architects.
- Material library – an actual shelf with samples of different materials that students can look at / feel.
- Workshops/courses in cooperation with other schools to get new insights and ideas.
- Photography studio could be upgraded so students use it more. This could include having an online booking system.
- Allow architecture students to go to other faculty's lectures. Make the notifications about interesting lectures public to let even architecture students get involved.
- Courses where the process is the focus and not only the result.
- Involve students in political matters – both local and global.
- The master program should be more linked to real life projects. Here students can learn about the responsibilities as architects and the consequences they may face.
- The exhibitions of the student work should be more public so more people have the chance to see and appreciate what the students do. An 'end of year show' could be an interesting idea to showcase what the students have been doing throughout the year and also to see the projects of different courses. This will give students an opportunity to see what happens in other courses and help them in their course choices.
- Make project management and economics a compulsory subject.
- Studios could be improved to provide a better working environment for students: let students 'decorate' the studios to suit their purpose.
- Thesis related to companies (support).
- More time for individual feedback during evaluations.
- Teachers and lectures with multiple backgrounds (double degrees).
- Use more simulation tools
- Flexibility when choosing courses- according to individual lack of knowledge. Allow everyone the opportunity to choose the courses they want/need to take.
- Opportunities to write reports together with Sintef and ZEB.
- Courses should have a clearer structure/schedule and show who is responsible for what part of each course if people need to contact someone/have questions.
- All students should have a stable working environment and a place to be at all times.
- Sustainability students would like to have a more clear focus on design for some courses.
- Clarify the title MA and MSC, do the Sustainability students classify as architects, if not why is there no A in the title?
- MSC students: Possibility to take courses outside the program.
- MSC students: Minimum requirements/skills should be enforced in order to apply for our 'in-courses'.



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