

THE GREAT CHALLENGE, STAGING THE DESIGN EDUCATION FOR THE NEXT 20 YEARS

Bjørn BAGGERUD, Casper BOKS and Jon H RISMOEN
Department of Product Design, NTNU, Norway

ABSTRACT

The Department of Product Design at NTNU and its product design curriculum will soon celebrate their twenty year anniversary. The curriculum has continuously been updated and adjustments have been made according to experiences. Now the department faces the challenge of a thorough curriculum rethinking, and will run a project called “The New Design Education”, DND in Norwegian, with external and internal participation. Our design education is holistically oriented, caters for a relatively small number of students, and has been a jewel at the university due to its pedagogical difference, visibility and appeal to very skillful students. If we fail in continuously being different to other study programs, the department is believed to cease to exist. The project will end up with a description of the New Design Study and a plan for implementation, at the end of 2011.

We have to make a major change to be modern in the next generation. This paper will be a summary of our preparations prior to what could be a revolutionary rethinking of our curriculum. What shall be the objectives, the values and the foundation of the future design education? What pedagogical tools will be available in the near future? What will be the human resources, among the tutors and the students?

During our work we were told by our students and alumni that the study has become indistinct, we have to make clear profiles with specialization in new markets. When we were looking at our framework, we found that it was possible to organize clearer design profiles with a high degree of specialization utilizing existing courses at our university, and choose cases in the design project courses according to the specialization. This makes it possible to educate designers with expertise that opens for new markets. We can offer education in more markets with stronger profiles using (almost) the same resources as before.

And then the revolution will start in 2012! Hopefully DND will start as a modern design education that challenges the students in a safe environment, based upon the latest research, using different pedagogical methodology and modern equipment.

Keywords: Design education, curriculum, designer role, and designer's skills

1 INTRODUCTION

The Industrial Design Engineering curriculum at the Norwegian University of Science and Technology (NTNU), offered by the Department of Product Design (IPD), started in 1993 as a 4.5 year curriculum, leading to a “*Sivilingeniør*” degree. In 1997 it was revised into a 5 year curriculum at university level, and the “*Sivilingeniør*” degree can be best translated as a Master of Technology. The main content and structure of the study has remained mostly the same since 1993 although we have continuously been implementing improvements. In the first years, the study was regarded as fresh and different at the university, partly because of the extensive use of project based education (PBE), and by being strongly profession based. Our design education is holistic oriented, it caters for a limited number of students (ca. 20-30 year per year, though increasing in recent years), and has been a jewel at the university due to its pedagogical difference, visibility and appeal to very skillful students.

Almost twenty years later, the program is still recruiting very skillful students (students need among the country's highest grade point averages from secondary education to be accepted into the program), although we are still using PBE in all our design education, some of the freshness seems to have gone. It is now time to look at the study with ambitions to make a study for the next 20 years, with a freshness that lasts.

Funded by the Faculty of Engineering Science and Technology, as part of their continuous strive to improve education, in 2011 the department runs a project called “The New Design Education”, DND at Norwegian, with external and internal participation. The intention of the project is to accumulate in a new, fresh study program that will continue to attract the best students, and prepare them even better for a challenging and inspiring professional career.

The DND project has three phases:

1. Information collection, analysis.
2. Development of a conceptual curriculum
3. Detailing, implementation.

This paper describes some important findings in the first phase of the project that are the basis and challenge for the new study program. This way, the conditions and requirements are sketched for what has to be done to make a fresh and crispy study that will keep its appeal over the next 20 years, deliver top designers to the society, and is based upon design research of excellent quality.

2 SELF-EVALUATION SURVEY

We started the project with a self-evaluation survey where all student and staff answered a questionnaire with 24 closed questions, and 3 open questions. We got answers from 55 students and 15 employees who represent reply rates of 55% and 75% respectively.

From the closed questions the main results were that, though generally not dissatisfied with the program itself, both students and staff found the study program to be without clearly defined objectives and identity, lacking engagement, and having considerable potential to be better in many directions. The answers from the students and the staff were very similar, indicating agreement about this situation.

The most important findings were that the program has become mossy and unclear for the students. Some of the staff may be forgetting that there are new students every year that have to learn the old stuff too. The objectives of the courses have not been always been updated / followed over the years, creating sometimes unmet expectations and uncertainty among students.

Through the survey, the largest potential for improvements was found to be in:

- Clearer objectives for the Master program and the courses
- Strong identity
- Firm leadership
- Good connection with design research
- Extended use of practicing designers in the education
- Better pedagogics and methodology for giving response
- A more modern curriculum and courses

The study indicated that the department’s strongest selling points today are:

- Good connection with the industry
- Good education in innovative solutions
- Good collaboration between staff and students
- Sufficient financial resources

The open questions gave us more than 200 comments and suggestions for improvement that will be structured and brought further in the process of developing the future design curriculum. Parallel to IPD’s DND project, the Industrial Design Engineering curriculum at Chalmers University of Technology in Goteborg, Sweden, is also performing a self-evaluation, allowing benchmarking of both studies, which will allow for further comparing and improving.

3 DESIRES FROM THE MARKET AND THE ALUMNI

A large effort was done to collect input from the external sources, in particular alumni. There is an open page at Facebook with reports from the process and ongoing discussions mainly driven by our earlier students. There have been workshops for students, employees and alumni regarding desires for the future study, and interviews have been used to collect viewpoints from important players in the market. As a summary from this activity we will highlight:

- The Norwegian Sivilingeniør/Master of Technology title, although internationally not a clear trademark, has been strong and useful in the Norwegian context, and must be kept for the future education – it guarantees a solid education in technology which helps employers to distinguish

between designers from NTNU (offering the only Norwegian university-based and technology-oriented study program in design) and other study programs

- The identity of the study should be clearer, and appeal to good candidates.
- There should be the opportunity for more explicit specialization, such as majors in product design, interaction design and strategic design. Service design is assumed to be the largest market in the near future, and has to be considered as a candidate.
- The strong connections between education and the business must be refined.
- The alumni want to participate active in the future education, and feel they have important experience to bring in.

4 BOUNDARY CONDITIONS

There are some boundary conditions for our study that we have to respect, although we want to think as free as we can. It is a given that our study shall lead to both a Master of Technology, and a “sivilingeniør” degree. This means that we will have a 5 year study program with 2 semesters each year consisting of 30 ECTS, mostly to be filled by 4 courses of 7.5 ECTS. To be a “sivilingeniør” education according to Norwegian law, we have to include five courses of mathematics and physics, and a set of other technical courses. Today’s design education contains 60% of design related courses, and this will probably be the same in the future. Also, the objectives for the study program and each course need to be established according to our National Qualifications Framework in line with the European Qualifications Framework (EQF), which emphasizes the results of learning rather than focusing on inputs such as length of study. Learning outcomes are to be specified in three categories – as knowledge, skills and competence.

We have a physical limitation in our building. We cannot have more than 30 students in each class without getting a new location, which is not on the agenda so far.

It is also expected that the education and research by the department shall be sustainable regarding staff and resources, which means that only a limited number of courses can be offered, with a limited number of participants for each course.

The education should given at the university, and is expected to be based on research, requiring a combination of better connections with ongoing research, increasing research efforts, and making design research as an integrated part of the program. A number of current courses already contribute this way [1-3], but there is room for considerable improvement.

We have a high degree of involvement from the industry and our alumni in our education today, and we have to continue this good practice. The challenge now is to make this involvement more binding, and hopefully connect this to research activities as well.

5 THE DESIGNER’S ROLE, TRENDS

During the last century, the designer’s role has developed as shown in Table 1. We have surveys from the last 10 years showing that the work for the designer is very much general product development, and project management, with a component of 3D-modelling and form giving. There has been a strong increase in working with design strategy.

Table 1. The development of the designer’s role, [4]

Aesthetics	Tends to	Holistic thinking
One material		Many materials
One product		Complex systems
Functionality		Identity
Concrete		Virtual
Individual work		Team work

We have started to include *Design Thinking* in our program, and will follow this philosophy stronger in the future by focusing user ability, creativity, holism and multidisciplinary. Bruce Nussbaum says: “*Design Thinking Is a Failed Experiment. So What's Next?*” [5]. He launched Creative Intelligence, or CQ, as the methodology for the future. We will still look at Design Thinking as an important way of staging creative processes, and will use it as a foundation of our design education, and this might live together with a development in other disciplines based upon CQ.

We have experienced that when our students work with students from other design studies, there is a common basis for design that all students have got [6]. It has never been expressed explicitly, but it seems to contain a design process methodology, a part of aesthetics, a part of ethics and a strong empathy for the user as a human being. It seems that we will make a new study that has these common skills as a kernel, and offers specialization directions for the latest part of the education. That said, our boundary conditions dictate that given the small study and department that we are, the number of specializations have to be very limited, and we have to combine the specializations we offer with those of other study programs.

6 THE NEW FRAMEWORK, DESIGN MAJORS

We have decided to keep our education as a 5 year Master of Technology, and this means that we have to include a set of courses regarding general science and engineering. These are separate courses given by other faculties at NTNU. We are not going to include these topics into the design courses as TU Delft has done [7].

There will be a set of general design topics that will form a set of general design courses that will be a part of all design majors. We will define a number of design majors that will represent clear design specializations. For each major there will be a set of specific science courses from NTNU, and a set of specific courses given by Department of Product Design. These and other considerations provide the boundary conditions for the new framework as shown in Table 2.

Table 2. The new framework with major possibilities

DND CURRICULUM					
NTNU		DEPARTMENT OF PRODUCT DESIGN			
10.semester	Master Thesis				Major
9.semester	Elective	D9 Specialization			specific
8.semester	Experts in Teams			D8	MASTER BACHELOR
7.semester	Elective			D7	
6.semester	Organ. & Econ.			D6	
5.semester	Statistics			D5	
4.semester	Physics			D4	
3.semester	Math 3			D3	
2.semester	Math 2	ICT	F&C 2	D2	Common
1.semester	Math 1	Ex Phil	F&C 1	D1	basis
	SCIENCE GENERAL	SCIENCE SPECIFIC	DESIGN SPECIFIC	DESIGN GENERAL	

7 OBJECTIVES, IDENTITY AND LEADERSHIP

The development of the study will follow our methodology for design strategies, with elements from traditional design processes. We will develop vision and values in an inclusive way, engaging all stakeholders as the students, staff, industry and society. These steering elements will then lead to objectives for the design program and the courses. Abstract and concrete identity will be developed, and a vision document will be made.

The vision document will express the overall philosophy of the study, its identity, its objectives, and how the study will interact with the society. The document will be used both as an internal and external guide for the study program.

8 PEDAGOGICAL POTENTIAL

It is a fact that our staff has low formal pedagogical education on average. It is also a fact that we are running an education using different pedagogical instruments to achieve good development of the student's skills. A survey done for all Norwegian studies show that our students get the best marks of all.

We look at this as a great challenge; we are humble for the potential of using pedagogical knowledge to professionalize our study. We will cooperate with UNIPED which is the main pedagogical resource at our university, and if possible / necessary we will start research projects with them to strengthen the basis for our pedagogic approach.

So far we have had the philosophy that results of pedagogical activities shall be measured as the difference between the students' knowledge and skill before and after a course. We also have as a core value that all education shall be done in an environment where the student feels safe. These two guidelines will be taken into the new study.

In addition we must make the courses so that they become easier to update as the theme develops. The student's development within a theme must not be limited by the teacher's knowledge/skill. This may require our courses to become differently structured, using pedagogical instruments to inspire and prevent mechanization of the design courses.

9 CONCLUSIONS

- The development of "The New Design Education" will be hard work.
- A survey done by the students and the staff shows that there is a lot of potential for improvement, and a willingness to participate in the development process.
- *Design Thinking* will be an important guideline for our new direction. The study will have a general part of science and design, and a specific part of science and design, specialized according to majors with clear profile of the directions.
- There will be a vision, value, objective process leading up to clear guidelines and identity for the new program.
- Potential in professionalizing the study by active use of pedagogical instruments will be a great challenge.
- The alumni will be active in the future education, and the education will be research based in different ways.

REFERENCES

- [1] Baggerud, B., Boks, C. *From Practice to Theory. Has our design research teaching influenced our education and research practice?* In: Creating a Better World. The Design Society 2009
- [2] Baggerud, B., Østerås, T. *Bridging design theory and practice in design engineering education.* Proceedings of the 2nd International Engineering and Product Design Education Conference, 2004, Delft, The Netherlands
- [3] Boks, C., McAloone, T. *The Design of Eco Board Games as deep-learning approach to Sustainable Product Design Education.* In: Creating a Better World. The Design Society 2009
- [4] Bjørn Baggerud et. al. *Industrial Design Engineering, 10 Year Anniversary*, Department of Product Design, 2003, NTNU
- [5] <http://www.fastcodesign.com/1663558/beyond-design-thinking>
- [6] Vatn, Gunvor Cecilie Dånmark; Baggerud, Bjørn; Rismoen, Jon Herman. *The Summer Design Office: A work-learning experience for industrial design students.* In: When Design Education

- and Design Research meet...Proceedings of the 12th International Conference on Engineering and Product Design Education, 2-3 September 2010, Trondheim, Norway. The Design Society 2010
- [7] <http://home.tudelft.nl/en/study/undergraduates-bachelors/undergraduate-programmes/industrial-design-engineering/bachelor-program/>