

ENTREPRENEURSHIP IN FUTURE DESIGN EDUCATION

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ABSTRACT

Design Methods and Design Thinking have become important elements in innovation and entrepreneurship processes. Introduction of design subjects into business and engineering educations shows this. Also designers enter new fields like project-, product- and brand-management. The paper presents reflections and ideas based on interviews with candidates, educated in both Industrial Design Engineering and Entrepreneurship. Different models for combining these different, but clearly complementary perspectives in university courses are presented and central questions for developing new courses are identified.

Keywords: Entrepreneurship, design education, design thinking

1 INTRODUCTION

Working with the Industrial Design Engineering (IDE) education we observe students becoming more inclined towards innovation and entrepreneurship. Recent surveys of job market for IDE candidates in Norway also indicate a turn towards project and brand management positions for IDE candidates[1]. The Norwegian University of Science and Technology (NTNU) has strategic focus on innovation and is amongst the leading universities worldwide when it comes to university-business cooperation. NTNU has an active Technology Transfer Office (NTNU-TTO) and a School of Entrepreneurship (NTNU-SE) which is well renowned after 5 years of operation. Even a new vice rector position was established in 2010 with responsibility for innovation and business cooperation. This paper examines aspects of this development and discusses future implications for IDE education.

2 THEORY VS. PRACTICE IN DESIGN EDUCATION

Educators continuously strive to balance research and practice and conflicting interests in modern design and IDE educations. In 2001 Findeli looked at the need for rethinking design education for a new century revising theoretical, methodological and ethical basis, concluding that design should become more proactive in proposing new scenarios for the future.[2]

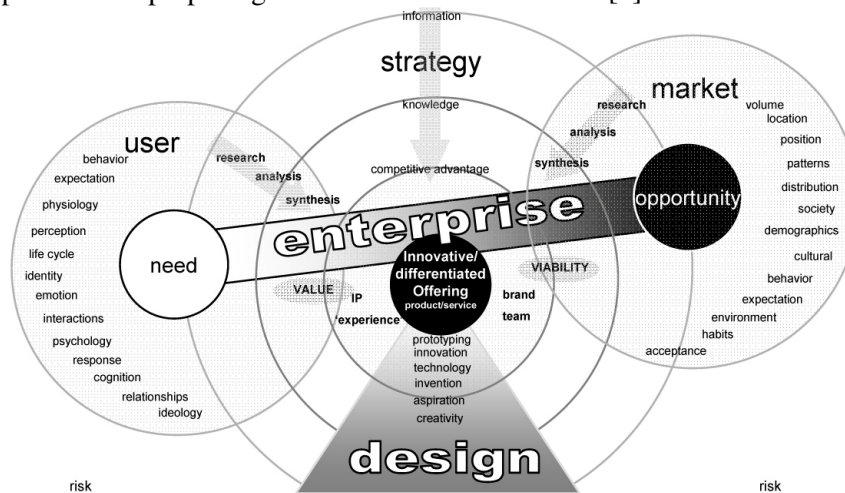


Figure 1. Design Empowered Entrepreneurship Equilibrium Model. from [4]

Texeira looks at undergraduate design education and concludes as follows. “Those who still believe that designers should acquire entrepreneurial and leadership skills only through professional experience and graduate studies fail to see how design, business (including management, marketing, and finance), and liberal arts education could be integrated into a new type of undergraduate curriculum.” [3] With this Texeira suggest to broaden the theoretical foundation of design education from the beginning, thus transitioning the curricula to the demands of knowledge driven societies.[3] In New Zealand a Design Industry task-force investigated how design was successfully integrated in a small number of “design-led” manufacturing companies. This was followed up by development of a Master-program in Product Design Enterprise at Otago Polytechnic.[4] Their model (Figure 1) illustrates the idea of balancing user needs and market opportunity on a design platform.

3 DESIGN IN MANAGEMENT

“How often do we deliberately design comfort for others? In an argument do we seek to design a comfortable way for the other party to accept defeat? In conflicts how much effort do we put into designing a way forward that suits both parties? Our primitive instincts of fighting and conquering are rather too dominant. Design is important but usually neglected. “ [Edward de Bono, December 2010]

Design Methods and Design Thinking have become important elements in innovation and entrepreneurship processes[5]. An example is the success of IDEO publications, presenting state of the art design methodology, stressing user focus and innovative power of design[6].

<p><i>How should we appear, through design, to our customers in order to achieve our vision?</i></p> <p>1. Design as difference Design management as perception and brand</p> <p>Market value. Customer value. Brand. Consumer research. Competitive advantage.</p> <p style="text-align: right;">VISION</p>	<p><i>To satisfy our stakeholders, how can design help in the business processes we excel in?</i></p> <p>2. Design as performance Design management as an innovation process</p> <p>Innovation. Modular architecture. Time-to-market. TQM. R&D. Technology.</p> <p style="text-align: right;">VISION</p>
<p style="text-align: right;">VISION</p> <p><i>How will we sustain, through design, our ability to change and improve?</i></p> <p>3. Design as vision Beyond advanced design management</p> <p>Strategic value. Vision. Prospective change management. Empowerment. Knowledge learning process. Imagination.</p>	<p style="text-align: right;">VISION</p> <p><i>To succeed financially, how should design appear to our shareholders?</i></p> <p>4. Good design is good business The historic DM economic model</p> <p>Financial and accounting value. ROI. Value for the society. Stock market value. The socially responsible enterprise.</p>

Figure 2. Design value for a company performance. from [7]

From a more academic point of view, Borja de Mozota discusses how management science is discovering the potential of design thinking in an uncertain environment. Design may be a useful tool in solving business problems other than product strategy formulation and emotional branding. This value added is not based on a product or sign, but on design competency, upstream design capabilities and knowledge, and specifically, the ability to broker knowledge and to engage in systems thinking, observation, visualization, and prospecting. [7]

4 DESIGN + ENTREPRENEURSHIP EXPERIENCE

A small number of students leave the 5 year IDE program at NTNU after 3 years of studies to enter the School of Entrepreneurship. We wished to investigate the possibilities this combined education gives the candidates and find out how they value their educational background. The number of interviewees for this investigation is small as only 5 candidates have finished the combined design + entrepreneurship education. Reflections and feedback on their educations were registered in a semi structured way, particularly asking for most important and least important aspects of both educations. See 4.1-4.5. In addition a group of former IDE students with hands on experience in entrepreneurship while still design students, was interviewed. See 4.6.

4.1 Job situation

The candidates are either employed in media and communication businesses or consultancy related to internet in one way or another. Some see this as a coincidence, but one also mentions that the leading edge of innovation is currently in internet based services and communication.

Type of Business	Job Tasks	In 5 years ?
Media and mass-communications, which is a coincidence Consultancy in management and digital communication	Brand building and online marketing Business development and innovation. Organizational development. Innovation and internet strategies.	In line, as product manager or similar with responsibility for results. Hopefully I hold a central position in own company. Leader of creative group. Project leader.

The table shows typical answers to questions about work situation and where the candidates see themselves in 5 years time.

4.2 Industrial Design Engineering Education

All candidates finished three or four years at the IDE program, similar to an IDE BSc Degree.

MOST IMPORTANT	LEAST IMPORTANT
<i>User focus and related methodology. Understanding of other disciplines and teamwork. To focus on user needs when solving problems. Understanding users and user needs. Training in presentation and visual communication. Design strategy, The Adobe tools</i>	<i>Materials science. (Because of the branch I am in) Drawings skills. We spent a lot of time in the workshop polishing and sanding models and "mockups", but on the other hand product have to "look good". I miss more Design Theory.</i>

Notably here, most of the interviewees dislike the craft based heritage of the design education, where students work with development of product form and hands on experiments in the workshop.

4.3 School of Entrepreneurship

The purpose of NTNU-SE is to educate future entrepreneurs by stimulating students to pursue new technological business opportunities and offer highly motivated students a two-year master study in commercialization of technology.

MOST IMPORTANT	LEAST IMPORTANT
Market/customer focus and the ability to speak the language of the investor. Positioning new concepts in a competitive market. Focus on becoming the best in a well defined niche market. Theoretic basis in: Strategic management, Entrepreneurship, Industrial marketing and International business. Combined with realistic practical experience with start-up companies.	Everything was useful. Models for international marketing, since I am working in a national market. History of entrepreneurship is not exciting but I guess it is necessary.

Students with at least three years of technological education are welcome as applicants to NSE which is devoted to educating future entrepreneurs and project managers of technological business opportunities (both in a start-up or within an existing company). The education achieves this goal by combining theory with practice. [8]

4.4 The Combination

Generally the candidates are happy with their combined education. The design basis with user focus and training in project work and communication and the NSE master with focus on strategy and business aspects. The two educations are seen as complementary as the user and the customer are not always the same person. While the designers often lack competence on market assessment and business strategies, entrepreneurs may lack the user focus and understanding of product development and process.

At NTNU one should establish new topics on strategy focusing on how to create products for the right target groups. There is need for an infrastructure supporting students in starting own business, finding partners and supporting contract work. One of the candidates states “I missed more theory and possibilities for specialization within the design course.” A possible direction could be product design and entrepreneurship with direct contributions from the NES. The axis user/need – product/service – Strategy/Marked should be characteristic for this specialization.

4.5 Other issues

At NSE all the candidates spent a three month period in Boston. We wanted to know how they value this experience. A final question about social entrepreneurship was included to get an insight into how the candidates follow the discourse on sustainable development and social innovation.

International experience	What is Social Entrepreneurship
Important but not crucial. Gives you: Perspective, network and looks good on CV The period in Boston was really important, but this depends on the school. Important for personal development and language skills.	Do not know, The ability to connect varying competences and resources to create something new. Enterprises in developing countries, aiming at local value creation.

All responses value the time in Boston of different reasons. Social entrepreneurship as a concept does not seem to well understood, with this group as the answers are diverse.

4.6 Kaliber Industrial Design

The possibilities of entrepreneurship have also been explored by students within the IDE programme. Most notably by the “Kaliber” group which came up with a promising product concept in a third year study project. They chose to develop the product concept further through several levels of product development and have now established a start-up company. The work was conducted partly within the IDE programme, as master theses and design projects and partly as own venture.

The MOSE is a hand-held device for on-shore oil spill cleanup operations. The device is designed and developed by Kaliber Industrial Design, and tested in cooperation with Mercur Maritime and the Norwegian Clean Seas Association For Operating Companies (NOFO).[9] The initial idea for the product MOSE was developed by the Kaliber group in 2007, within the framework of a 3.year design studio dedicated to mechatronics. Early 2010 the three IDE students got support from industry to take the idea several steps further, both he product/system concept and business development.

Kaliber Industrial Design AS was established July 2010. The company is owned by NTNU-TTO (15%) and the inventors (85%).

The MOSE project won a range of national and regional innovation awards in 2010: Winner of “Phase 1”, Venture Cup 2010, Winner of “Best Student Idea 2010”, Venture Cup Winner of the “DnB NOR Innovation Prize for Mid-Norway 2010”, Winner of the national “Tekna Innovation Prize 2010”, 2nd place in the “National Finals”, Venture Cup.[9]

These awards enabled the startup of an own company and a realistic product development towards a working industrial prototype, also figuring as a result of two master thesis in February 2011.

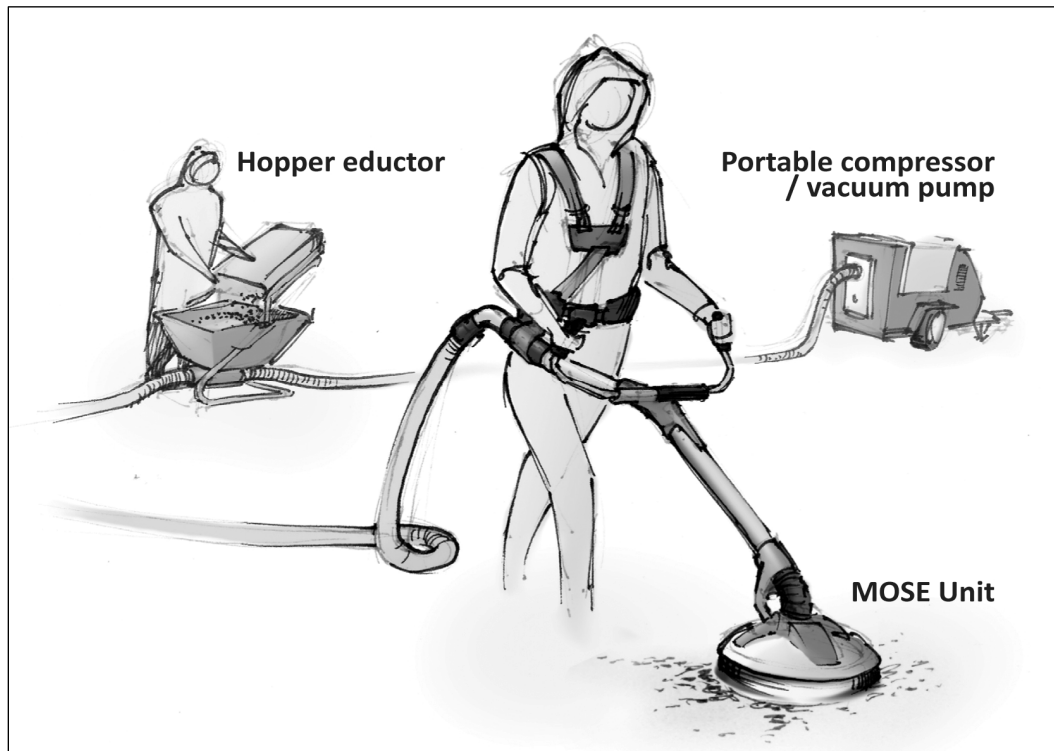


Figure 3. The MOSE oil clean-up system developed by Kaliber Industrial Design [9]

While the product development project was backed up by the Product design department and NTNU engineering expertise, The Kaliber group was invited to work with a class of NSE students on the entrepreneurial parts. This cooperation contributed extensively to the development of the business plan for the MOSE project.

5 PATHS FORWARDS

There are more ways of connecting design and business perspectives in an educational setting as there are different ways of linking design and engineering education to real world problems. Where the NTNU-ES focuses on start-up ventures, other approaches focus on innovation by cross disciplinary teams often in close cooperation with established companies. The last approach has been developed by K. Ekman and colleagues at the Aalto University in Helsinki, since 1997. A Product Development Project (PDP) course invites students from the School of Science and Technology, the School Art and Design and the School of Economics to work in groups with projects from industry. Students from other institutions worldwide are also partaking in PDP at a growing pace. [10]

Another approach has been developed by the faculty of Industrial Design Engineering at TU Delft.[11] The focus of their MSc Programme in Strategic Product Design is on the ‘fuzzy’ strategic stage that precedes the actual development of a new product or service. The programme puts emphasis on translating corporate strategy in coherence with market developments and market opportunities into a sound product development portfolio. The worldview here, working with established companies is similar to the PDP course in Helsinki, but the scale is larger, with a two year master programme building on the three year master in IDE.

With focus on sustainable development and global consciousness, we finally mention the Centre for Social Innovation (CSI) at Stanford USA. Anchored in the School of Business the mission of CSI is to “break down boundaries and promote the mutual exchange of ideas and values across sectors and disciplines and between theory and practice. Furthermore to build and strengthen the capacity of individuals and organizations to develop innovative solutions to social problems[12]. Here we find a cross-disciplinary course where students apply engineering and business skills to design product prototypes, distribution systems, and business plans that address challenges faced by the world's poor.[13] Another initiative from CSI in cooperation with design company IDEO, is an open competition to find ways to expand the global network of potential bone marrow donors and support

people who are battling leukaemia and other blood cancers. [14] The last example illustrates recent trends based on design thinking, in innovation processes and education. The internet community approach (OpenIDEO) with an open space where everyone is welcome to participate, the focus on social innovation and finally designers turning their attention from creating new products to work with creation of networks and services.

5 SUMMARY

The issues presented in this article indicate interesting opportunities for strengthening the IDE education at NTNU with topics on innovation and entrepreneurship. Several relevant issues and questions relating to combining design and entrepreneurship in education have been touched upon. The central dimensions seem to be: Perspectives on business and entrepreneurship, educational concepts, scale and emerging topics.

- Business perspectives: Start-up ventures, established companies, social entrepreneurship
- Educational concepts: Cross disciplinary cooperation. Design or entrepreneurship profile. Balance between practice and theory.
- Scale of education: One elective topic, program specialization, a new master degree.
- Emerging Topics: Social innovation and entrepreneurship. Design thinking as an element in business and management education.

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