THE FOCUS OF SKILLS IN EDUCATION AND THE DESIGN INDUSTRY

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ABSTRACT
With constant technological, social and cultural changes in the design industry it is important for educational courses to teach the most relevant skills. Students are faced with the choice of specialisation in order to ensure a successful career after graduation. Which skills do students, professionals and faculty perceive to have the highest value? This study aims to help faculty and student to make informed choices. Opinions of the value of different skills are examined through personal reflection, interview and a survey of product design students, faculty and alumni working in the industry. Social skills were found to be the most valued, followed by theory and technical skills. The main divergences were that tutors, and design professionals valued presentation skills and data analysis more than students, whilst students valued 2D digital software skills and communication skills more. Digital skills were more valued than physical skills. For an academic career, or to become known in the industry, specialisation is key. For career flexibility, proficiency within a range of skills opens up a variety of choices. The increasing rarity of physical workshop skills could increase their worth with time but working digitally allows for greater freedom and the shift towards theory and methodology based service and sustainable design could lead to better thought out products and services. It is also relevant to look at the impact that a design career can have on the world and plan to have the best possible impact.

Keywords: Design skills, design thinking, design teaching, curriculum, career

1 INTRODUCTION
This article is inspired by the researcher's experiences of over specialisation in Norway's limited job market, focusing on traditional workshop and craft skills, in the creation of high-quality custom products and prototypes. Studying a master's degree in product design was intended as a recalibration into the digital age in order to employ the best aspects of traditional and modern design techniques. This research was intended to assess this aim through better understanding the Norwegian design industry and emerging trends in product design. Although the results are subjective and Norway centric, the broader ideas will be relevant to other students and designers in similar situations.

Product design is no longer constrained to the design of physical products, but also complex services that cater to the whole spectrum of human behaviour [1]. The choices of specialisation made by students can affect their future career. The freedom to choose the themes for projects enables students to construct a portfolio aimed towards the kind of work that they wish to pursue after graduation. It is also a useful time to analyse the motivation that drives one's work. As a designer it is possible to focus on issues ranging from the mundane to critical, at the personal, local or global scale. Although this article does not address the ethics of design, it is important to consider when designing products that they should have as positive an impact as possible on human welfare and the environment. 'Design can broadly be defined as deliberate action aimed at turning existing living conditions into preferred ones' [2]. There are many groups working to catalogue the problems that humanity faces. The research group *80000 hours* focuses on using data to empower people to positively impact the most people possible through informed career and life choices [3]. *Project Drawdown* ranks potential solutions to the problem of climate change through the reduction of atmospheric CO_2 [4]. The *Open Philanthropy Project* is a research and grant-making organisation that focusses on sharing research and supporting projects that maximise the long-term prosperity of humanity [5]. Vox media's section *Future Perfect* examines the complex problems facing the world and how to solve them using the principles of effective altruism in "finding the best ways to do good" [6].

2 BACKGROUND

Which areas of study should product design master's students focus on in order to be the best prepared for real-life experiences working as a designer? Many freelance designers would categorise themselves as generalist, working with clients on a broad range of projects and utilising different methods, materials and media depending on the case. Generalisation allows for flexibility and an increased chance for cross-pollination as different skill sets, insights and perspectives are accumulated with each new area of work. Having a broad selection of skills to draw upon is also beneficial when encountering work situations where people have unclear expectations of what the work of a 'designer' actually entails, allowing you to cater to their specific needs and increase your ability to deliver a service that is valuable to them.

Alternatively, specialisation in a particular field allows you to delve deep into a topic, which is especially relevant in academia. "In the university, specialists' rule. As a result, designers are misfits: generalists in a world of specialist" [7]. Specialisation may however limit your options and can make you less resilient to market fluctuations.

With the introduction of more holistic macro design processes such as service design, systems-oriented design and Giga mapping and an increasing focus on scientific theory resulting in written research articles, designers are able to have a deeper understanding and a more structured impact on the projects that they work on. Design is shifting towards "a deeper and more sustained form of user engagement, with products, services and experiences; steering our gaze toward an economy where resources are used sustainably through design for longer life, upgrade, re-use and repair; relocating design as an essential driver of social, economic and environmental revolution" [8]. Donald Norman calls for the education of designers as "applied behavioural scientists" stating that designers need to be taught a better understanding of "complex issues, about the interlocking complexities of human and social behaviour, about the behavioural sciences, technology, and business" [9].

3 METHODS

To examine the different values assigned to skillsets within the design profession, insights were collected from the field through an interview with the head of master studies in product design at *Oslo Metropolitan University (OsloMet),* surveying the opinions of students, tutors and alumni, and through reflections on personal experience.

3.1 Survey

Survey responses were received from 35 participants; 7 tutors with an average of 9.3 years work experience in design, 14 students (avg. 1 year of work experience) and 14 professional designers (avg. 6.5 years). Answers were compared between these three groups as well as answers from respondents with less than, and more than 3 years of experience working in the design industry. This was an attempt to account for the fact that some designers would have recently entered the workforce and have limited experience and some masters students had previous experience working as designers in Norway totalling more than 3 years.

The areas examined in the survey were grouped into; **theory** (Creative problem solving, aesthetical taste, data analysis, material knowledge and research methods), **technical skills** (3D CAD/CAM software skills, 2D digital software skills, drawing/sketching skills and physical workshop skills) and **social skills** (teamwork, presentation skills, communication skills and networking). These categories were chosen through conversation with design students and lecturers at OsloMet.

The results from the survey reveal the subjective opinions of participants on how the design industry works based on current and future trends concerning analogue and digital processes. The questionnaire was sent to product design bachelor and master students at *OsloMet* as well as the design tutors in the department and product design alumni. The survey could be expanded to included results from design courses at other institutions both in Norway and overseas.

4 FINDINGS

The highest valued area overall was social skills, with teamwork, communication skills and presentation skills ranked the highest. The most valued theory skill was creative problem-solving. Physical workshop skills, research methodology and data analysis were valued the least.

What knowledge, practical skills and general competencies do you think are the most important for working within the Norwegian design industry?
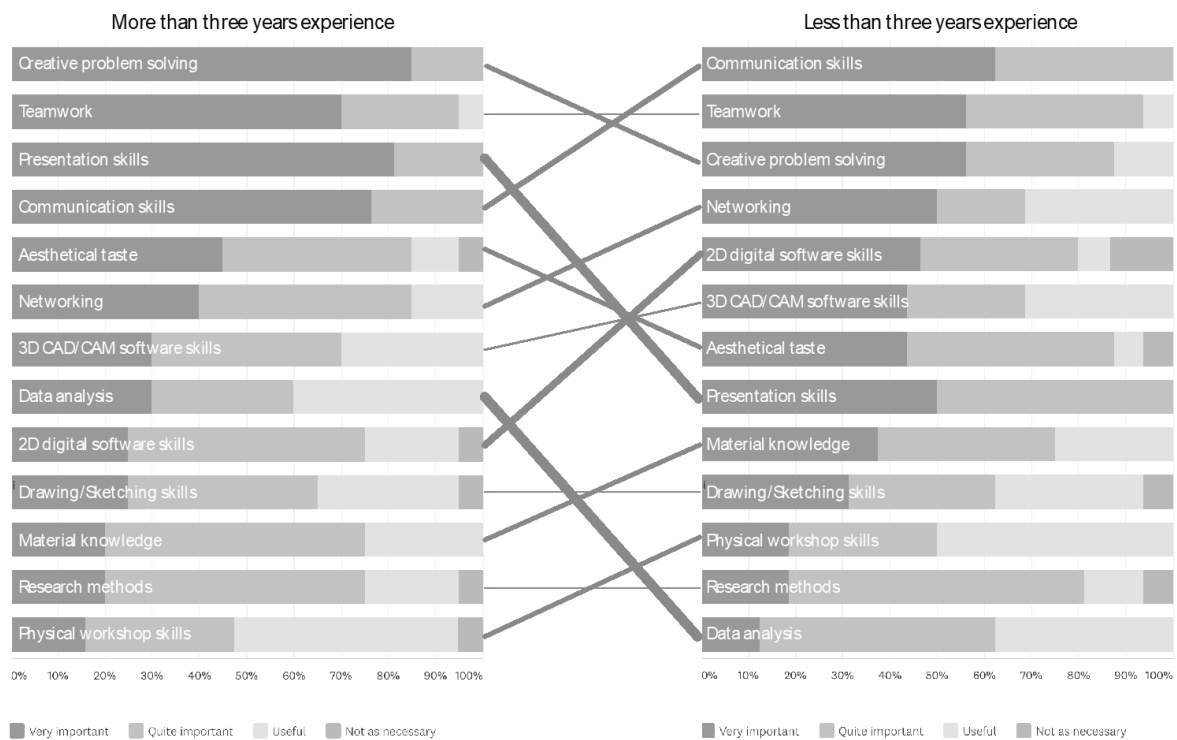
There were some notable differences in valuation between the different groups. Tutors and design professionals set a higher value to all skills in general, this could be due to a more rounded understanding of the benefits of different areas. Design student's valued communication highly whilst tutors valued presentation skills equivalently, these are both key tools in conveying a student's level of understanding to tutors. Students valued 2D digital software skills more highly that professionals who in turn placed more worth on data analysis than students.

4.1 Interview

An interview with Torgrim Eggen, head of master's studies in product design at *OsloMet* looked into the different aspects of skills within the design syllabus. He noted that the broad nature of the design field incurs the risk that students may stray too far from the parameters of the syllabus and how important it is for design tutors to have clear enough boundaries of what constitutes product design in order to prevent students from ending up working in areas where tutors are unable to help them [10]. Torgrim explained how the design course is structured to stay relevant and up to date with trends in Norway, Scandinavia, the Nordics, and the world by collaborating with other design courses and international forums, direct contact with actors in the industry and through external censoring. Torgrim believed that the most important skills for a designer are teamwork and presentation skills, which aligned well with the findings from the survey. He emphasised the growing demand for design competence in different sectors of society, and how the increased visibility of its benefits is allowing design to blend into all aspects of life. Increasing awareness of design methodologies like service design and design thinking are entering industries that previously would not apply such approaches, increasing the opportunities for designers [10]. During the interview, the importance of sustainability in design was highlighted with reference to the *Sustainable Development Goals* set by the *United Nations* being likely to have an important impact on the future careers of designers, and the world [11].

When talking about digital design methods, the combination of traditional and modern design techniques was suggested as a path towards more interesting results, although it was noted that the choice between analogue and digital can often confuse students, with them not knowing where to focus, since both skill areas take huge investments in time and energy to master, within the finite study programmes. He mentioned that the modern digital era allows us to reflect on the loss of analogue processes and techniques, and to respect the simple complexities of traditional craft skills, while blending the best

aspects of the traditional and modern manufacturing processes ought, perhaps to be the goal. He remarks that the best learning technique no matter the medium is to make as many iterations of a product as possible within the allotted time frame, digital skills can increase the efficiency of this process, but it is the message that is conveyed that is important [10].

5 DISCUSSION

5.1 Social skills

The importance of social skills in the design process can be attributed to the complex social dynamics of the design process, forcing designers to work alongside users, other designers and experts. Designers are wise to collaborate with others in order to fill-in inevitable skill gaps, and in order to form a more complete understanding of complex systems as holistically as possible.

5.2 Technical skills

The practical skills that were valued the most were digital skills with 2D software skills rated higher than 3D CAD/CAM software skills. Digital design skills enable rapid visualisation of concepts and ideas facilitating communication through the use of semiotics [12]. The mastery of digital programmes like Adobe Photoshop and Illustrator enable designers to contribute to projects in a visibly useful way.

3D Digital modelling frees designers from the confines of flat paper and the limitations of working with physical materials and allows for levels of complexity in design that are only just beginning to be explored. Physical workshop skills were the least valued of all. The reason is unclear but could be due to a lack of accessibility in most people's day to day lives. It could also represent the respondent's lack of personal experience with that area of design, since having access to a workshop is a luxury that many cannot afford. Physical workshops also have the negative aspects of limiting your location, material and tool accessibility, size of work area and storage space constraints.

Digital design has no such limitations, the barrier for entry is ownership of a computer, software licenses and the time spent learning to use the programmes. The ease with which one can work globally utilising phone calls, instant messaging, email, video messaging, digital file sharing, co-working spaces, desk sharing, maker spaces, and global outsourcing networks means that a laptop is the only tool that you need. A digital skill set means that wherever you are you can work. There is even the choice for those choosing to work entirely digitally to work remotely from countries with lower costs of living or offering appealing leisure lifestyles [13]. This could be a good fit for those that have already established themselves as an expert in a particular field and are sought out by clients. The domination of digital design over traditional handcraft skills has been compared to the industrial revolution replacing weavers with machines [14]. There is an emerging potential for bridging the gap between traditional craft techniques and modern digital fabrication techniques.

5.3 Theory

Working with mental knowledge, theory and the communication of ideas allows designers to work as consultants and strategists. There is potential for the physical manifestation of projects to be delegated to skilled specialists once the design process is finalised. The shift from selling physical products towards providing services has its benefits; the customer does not want a CD they want music, not a hotel, but a comfortable night's sleep. Working with and catering for the need of the customer means that their core values can be provided for and services honed over time. Providing sustainable services can encourage companies to design higher quality products that last longer and that can be reused or recycled, keeping precious material flows within a company's asset portfolio rather than sending them to landfill.

That research methodology and data analysis had a low value could be due to the traditionally practical nature of product design. Don Norman states that "Designers are practitioners, which means they are not trying to extend the knowledge base of science but instead, to apply the knowledge. The designer's goal is to have a large, important impact" [9]. Combining scientific and design processes seems like an area that ought to be valued more highly, due to the potentially large impacts that design can have, good scientific understanding could result in significant real-world benefits.

In terms of which areas of design people enjoy the most, it makes sense that students would appreciate the practical making process (*OsloMet* encourages students to explore physical product design skills) as they are in the process of learning about a wide range of materials and techniques in preparation for an

as yet undefined future career. Professionals are spending their time working on a range of projects in their work so problem detection and problem-solving would be vital. An important part of a tutor's job is to facilitate learning and encouraging students to fulfil their potential. These areas of enjoyment can be seen as the three stages of a design career; learning new skills, practicing and refining them and then passing on your collected knowledge to the next generation.

6 CONCLUSIONS

It is important that time at university is spent mastering as many skills and methods as possible, building on your existing skills and strengths and fortifying them in a process of compound learning. Once employed, learning new skills may be more difficult to prioritise or have control over. The unique perspectives that arise from combining different skill sets and backgrounds mean that it is wise to get as much and varied experience as possible. All learning is useful in some way, lifelong learning is a useful tool in retaining some amount of control in an ever-changing world [15].

Social skills are vital for a career in design. The design industry in Norway is small, so building up a network and getting to know your peers is important. If you choose to specialise there will only be a handful of people in your field and it would be beneficial to work well with them.

Although the future of design seems to be steering towards digital tools and services. It is wise to embrace modern design tools, learning to present, sketch, sculpt, model, and communicate fluently in the digital medium. Those choosing to work with physical products may not need to invest in establishing physical workshops, as manufacturing at different scales can often be outsourced and workshop space can be rented or shared when needed. The future for many is going to include working with AI, big data, Machine learning, VR and AR in ways that are only just beginning to be explored and incorporating these tools into all areas of the design process. These areas have potential to change society and the world and ought to be designed to complement human strengths; morality, ethics, compassion and creativity.

The realm of product design is expanding in scope; it is no longer simply designing physical products for sale but now needs to incorporate the more complex issues of the social, ecological, political and environmental impacts that design can have on the world [16]. The areas of service design and sustainable design can work well together to improve systems at both the sociological and environmental levels, creating the potential to achieve a balanced *triple bottom line* in a product or service that can generate profit as well as benefiting people and the environment [17].

The future that awaits product design students is unclear, and it is challenging to be prepared for whatever future awaits. Fortunately, design skills and theory are easily transferable and are increasingly recognised for their benefits in different business sectors. Specialisation is especially important for a career in academia, research or for becoming well known in the design industry for your work in a particular area.

This research article shaped the course of the researcher's studies, steering towards the digital realms of service design and sustainability and seeing the potential to contribute to the society through design research, planning and thinking rather than making.

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