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Designing Universities of the Future

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Abstract: How can we reform curricula, and universities at large, through a participatory design approach? Two development processes, one from Umeå Institute of Design in Sweden and the other one from Aalto University in Finland, are shown to exemplify this. These cases are used to highlight different practices on how change is designed and executed, what the prerequisites for a successful process are, what challenges these approaches bring, and how we can develop the practice of developing universities - thorough a participatory design approach - further.

Keywords: participatory design, university development, education

1. Introduction

In the call for the DRS2016 conference we ask ourselves how design, and design research can be a creative and active force for rethinking design. At the same time we are asking ourselves how design, and design research, can be an active player societal change. We will need new kinds of designers; with new knowledge, skills and attitudes.

Currently universities are largely educating designers in similar ways as they have done in the past decades (if not almost a century). How can design be a creative force in changing this? Should we prototype and redesign our curricula? Or should design approaches rather be applied in restructuring our universities; including their organisation and operations?

2. Changing education

Our current educational models in design originate from the societal structures rooted in the industrial revolution. The division of labour and industrial manufacturing made it possible to see design as a separate activity in production and to have specialist designers (Forty 1986, 29). Craft schools were largely founded in the 1800s, and design education was further developed in the 1900s, with the arrival of modernism, and the new ideals of the Bauhaus.



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Many design schools still base their basic structures around the principles set out at the Bauhaus in 1919-1933 (and the Hochschule in Ulm 1953-1968) – studio based teaching, learning through doing, often in workshops, and a practice based research tradition. (Droste 1991, Cantz 2003, Lawson 2005,7) Design teachers have traditionally been practicing designers who pass on their knowledge, skills and values through a process of apprenticeship. (Cross 2007, 19).

At the turn of the twenty-first century, the rise of the new, global information society has changed the relationship between higher education institutions and society (Slaughter & Rhoades, 2004). The current fundamental socioeconomic changes move us towards a knowledge era where the construction of and access to information will determine well-being (Donald 1999, 36). Both general and specialized knowledge will be needed, and the skills to acquire and utilize the knowledge on a continuous, lifelong basis. Universities are claimed to be in the centre of this global revolution (Donald 1999, 36).

It is not only the socioeconomic change of the knowledge era and the political pressure to educate more people to meet the needs thereof that is transforming the universities today. There is also a growing concern that the skills and attitudes that young people bring to their roles as workers and citizens are inadequate, as well as a new level of market-orientation and competition among higher education institutions (Newman et.al 2004, 1 and Scott, 1997, 46).

The current university system has been facing increasing economic challenges. The huge expansion of student numbers, particularly in the US and Britain, has been feared to create a McDonaldisation of higher education where quests for volume and speed override those of quality (Hayes&Wynward 2002). The management revolution in (especially US) higher education (Keller 1983), with increasing management practices, control, and financial models similar to companies; focusing on fund raising and higher tuition fees; has also been highly criticised.

In this paper, the main cases reside in the Nordic countries, where education policies and funding are mostly government (rather than market) driven (Rinne&Jauhiainen 1998). Here the first craft schools were founded in 1844 in Sweden and 1871 in Finland, and have largely been developed during the 20th century according to Bauhaus-based ideas. (Korvenmaa 2009, Hedin 1994, Huovio 1998, Sotamaa 1999, Rinne&Jauhiainen 1998, Andersson 2009) The historical development trajectory is very similar to that of other countries, but the stronger governmental coupling has created some differences, as well.

Firstly, the government provides the most part of the university funding and education is (mostly) free for students. The student intake is often regulated, and increasing this intake would not necessarily increase the university funding. Therefore, the explosion in student numbers and the competition this causes between the universities has been less of an issue in the Nordic countries than elsewhere, and the discussion has largely been on developing the quality of education and research rather than the volume of it.

Secondly, these educations have often had a stronger link to national policies and politics than to market specific needs. This was seen in the seventies with the strong humanistic orientation and ideologies of a societal inclusion (Korvenmaa 2009,227, Wickman 1994, Valtonen 2007) just as well as during the new millennium with newer policies on innovation and competitiveness.

Despite these differences the process of how to create change in these environments is still comparable globally. The arrival of new means of communication, like the internet and social media, changing production and distribution, big data access to information etc. have only accelerated these requests for change. Many universities have approached digitalisation by spreading their existing curricula to a broader audience through MOOCs (Massive Online Open Courses). We have also seen new openings in how universities or design schools are managed, and the usage of social media within. For example John Maeda (2011), as President of Rhode Island School of Design 2008-2013, wrote about a new kind of management, and promoted his ideas of sharing to broader audiences through social media such as Twitter.

3. Transforming a university is not easy

The most traditional way to change a university is to introduce new knowledge through disciplinary research (Gibbons 1999, 23). Through research, the stock of specialist knowledge grows and transforms the content of disciplines; in time this changes the curriculum, and alters what is regarded as essential.

According to Gibbons, new practices are being introduced and the mode of knowledge production is changing in significant ways. He calls the traditional model of disciplinary, specialist research driven approach *Mode 1*, and claims that it today co-exists with a new type of knowledge production, which he calls *Mode 2*. He describes five attributes that define knowledge production in Mode 2 and differ it from the traditional form of knowledge production:

1. Knowledge is produced in the context of application, rather than within specialized areas of academia
2. it is often transdisciplinary
3. knowledge production demands diverse skills and problem-solving teams are hence often heterogenic and contain organizational diversity
4. the social accountability and reflexivity increases and
5. the quality control of what is academically produced does no longer come from the metrics of academia alone, but includes a diverse range of intellectual interests as well as social, political and economic relevance.

Despite the urgent need for this new type of knowledge production Gibbons concludes that Mode 1 is still the dominant one in todays Universities.

In most cases it is a department (as an organization of a discipline) of a university that is responsible for determining the curriculum and hence for determining the learning

objectives of courses and programmes, the kinds of pedagogical and learning strategies utilized, and the methods of evaluation employed (Donald 1999, 40). Donald shows that attempts of curriculum reform, which are open to perspectives and methods of other disciplines, are very rare and in general curriculum is not examined outside of the discipline (Donald 1999, 41). Explanatory approaches are rare in developing university curricula and when universities do develop, they develop with a narrow view of specialist knowledge and research. In addition, most university curricula are never developed on a strategic scale, but tend to evolve one course at a time. In practice, even the need for new courses is rarely determined on a logical basis, but come into being for reasons related to department survival, institutional prestige, etc. (Toohey 2002, 21)

In addition to the academic quest for a change from within, many universities are also facing developing needs due to external pressures, like the decrease of funding or new governmental strategies.

The question then becomes if the educational institutions can renew themselves and respond to the rapidly changing world and the often conflicting requirements of industry relevance, academic research, artistic qualities, technical understanding, questions of practice vs. theory - or if the existing institutes will be faced with entirely new competition and die as obsolete? And how can we use design to achieve this change?

4. Designing change

In addition to the studio-based teaching of the Bauhaus, design teaching has been influenced by the theories of the Reflective Practitioner (Schön 1983). Designers approach a practical problem, prototype it, reflect over what they are doing in action, and then learn and make conclusions based on their reflections rather than any pre-defined theoretical base of knowledge. Schön (1987) also talks about educating the reflective practitioner and shows an experiment where reflective practicum is the first step toward remaking a larger curriculum (1987, 343). He says that the base of faculty participation can be broadened (and earlier also talks about student involvement) and that the development of a reflective practicum can join forms with new forms of research on practice, and education for it, to take on momentum – even a contagion – of its own.

Cross (2007, 22-29) identifies designerly ways of knowing, distinct from the more usually-recognized scientific and scholarly ways of knowing; designers tackle “ill-defined” problems, their problem-solving is solution-focused, their mode of thinking is constructive, they translate abstract requirements into concrete objects and they use codes to both “read” and “write” in object languages. Nelson and Stolterman (2003, 291) also remind us that designers need to be educated with the understanding that they are expected to produce unexpected outcomes, a quite different approach to most other disciplines where students are taught to produce expected outcomes based on the data available to them.

Today many conventional divisions between design practices are breaking down and designers confront problems they are unable to grasp or solve. Already in 2002 Victor

Margolin (2002, 31) said that we could consider this a crisis but also a healthy opportunity to look beyond the existing boundaries of the distinct professional practices. He continues that there is today an emerging interest among some design educators in generating new academic programs that cut across departments of engineering, industrial design, and marketing, for example, or in setting up projects where students from different departments can work together. Tim Brown (2009, 222) promotes *Design Thinking* and claims that designers have learned some powerful methods for arriving at innovative solutions. He asks how we might use those methods not just to educate the next generation of designers but to think about how education as such might be reinvented to unlock the vast reservoir of human creative potential?

So clearly, our own professional practice and design research academics are looking for new answers within the educational field. The question then becomes how we could design a future university? And on what level do we challenge the existing activities; curricula, organisation and operations, approach or concept?

If we develop design education through a designed process, then we apply the very basic standpoint of Participatory Design – that those affected by a design should have a say in the design process. Bjögvinsson et al (2012) develop the concept of participatory design into infrastructuring, where infrastructuring entangles and intertwines activities at project time (e.g. selection, design, development, deployment and enactment) with everyday professional activities at use time (e.g. mediation, interpretation and articulation), as well as with further design in use (e.g. adaption, appropriation, tailoring, re-design and maintenance). They position this approach of design to be less about the new or about innovative products, but rather as a practice committed to the work of envisioning emerging landscapes of design through which social and material transformations take place, landscapes shaped by the opening up of questions and possibilities.

Katja Soini (2015) has in her recent doctoral dissertation explored how design can be used to facilitate change. She positions collaborative design as a design approach which aims at building a bridge between users and organisations to collectively create futures that would resonate with people's everyday and bring value for people, organisations and society alike. (Soini 2015, 11). Many of her practical examples come from the complex infrastructures of housing modernisation, and show how user-centred design has helped in imagining beyond the existing realm, provoked critical debates and encouraged radical reinitiating of the repair construction industry. In the next sections we will look at how universities, which are just as challenging as social constructs and infrastructures as the construction industry, can be approached with designerly means.

5. Prototyping a university

In order to exemplify this process two development cases will be shown in more detail, one in Sweden at Umeå Institute of Design (UID) and the other in Finland at Aalto University (Aalto), and these will be related to similar projects elsewhere in the world. For the two

Nordic cases published material, anthologies on the schools' history (Andersson 2010, Huovio 1988, Sotamaa 1999), the universities own websites, and annual reports have been used. In addition, student and faculty essays on curricula development (3 years with approximately 100 essays each year) from the "Prototyping the Future" exercise have been used for the case of UID. These essays have been connoted and further analysed based on loose theme headings. In the case of Aalto, we have also had access to a large set of unpublished archive material, such as meeting minutes, reports, strategies and project leaflets.

5.1 Prototyping curricula together with students and faculty

In prototyping new solutions for curricula there has been several solutions lately. At Umeå Institute of Design (UID) in Sweden, a large prototyping exercise called *Prototyping the Future (PtF)* was conducted during the years 2011, 2012 and 2013. The idea was to define what future curricula needs might be, and prototype them, in order to make further decisions based on the prototypes.

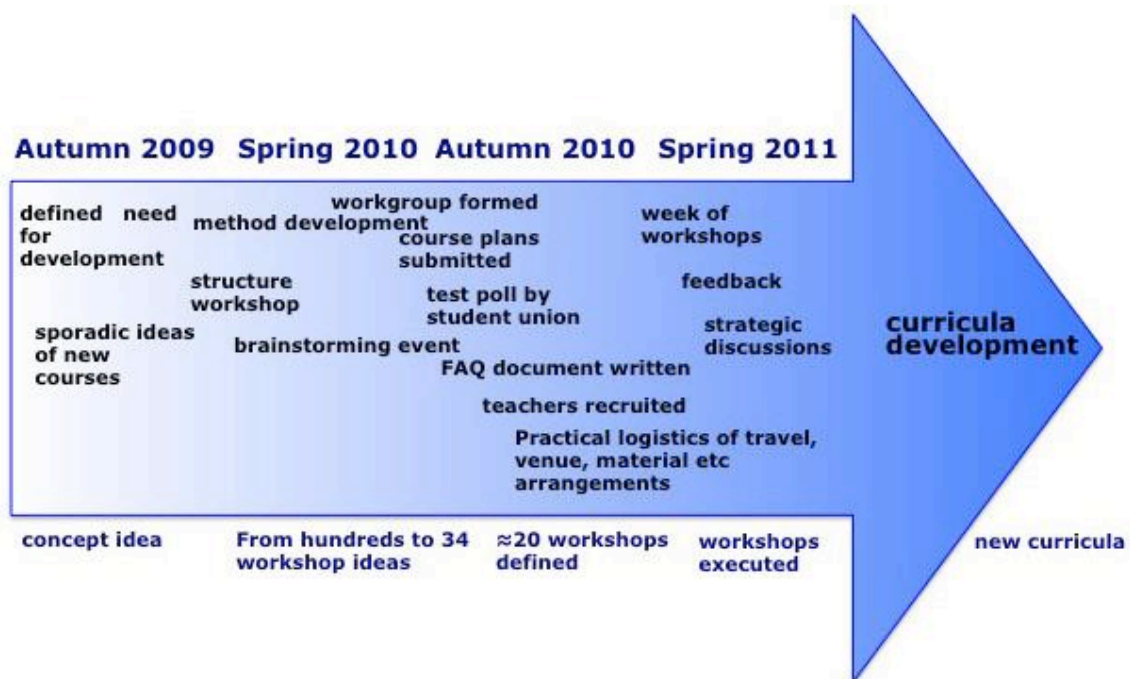


Figure 1: The initial timetable for the Prototyping the Future exercise in 2011

Following participatory design ideals the development process started late in 2009 and in 2010 staff and students developed a concept of a test course period. Here all students, faculty, and staff, would be taken out of their normal chores to participate in one-week-workshops in completely new subjects, tutored by invited international top level experts. In short, the idea was to test the new curricula topics with the highest possible quality, and

then analyse the results together and make decisions about future education based on this knowledge.

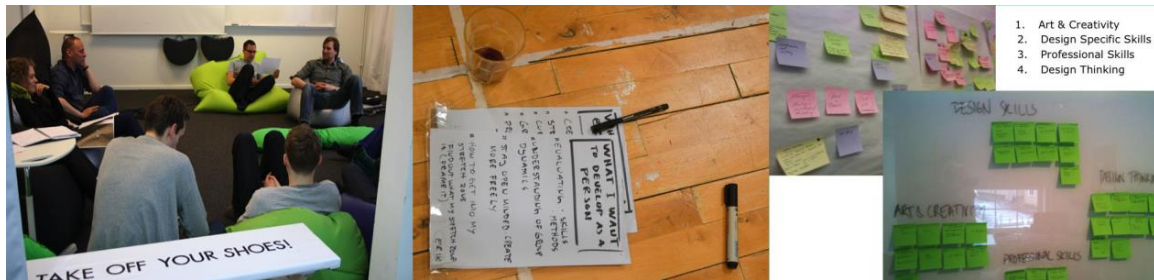


Figure 2: Students and staff developing the first PtF courses

The aim was a designerly way of approaching university development: to look at things from a new perspective, be creative, reflect on action and aim to understand the needs of the users, in this case the students, and try to predict the professional lives they might have ahead of them for the next fifty years.

The first year the project was rolled out 20 one-week courses were arranged, and in the 103 feedback essays from the week's experience many members of faculty and students commented on the actual substance of the course prototypes. Often this input was related to the respondents own future wishes:

“For my degree project I will be designing a vehicle, which can harvest energy from the exterior environment through a combination of smart materials. Therefore this course [on smart materials] could not have come at a better time for me, as it gave me the opportunities to understand, interact and learn about the materials I intend to use, in person. I had the opportunity to learn about Piezoelectric materials, Shape-memory Alloys, Shape-memory Polymers, Smart Gels and Magnetostrictive Materials.”

“Many see design as a visual artistic profession about shapes. But it is an artistic view of multidisciplinary approach to problem solving process. These problems are largely from the industry or marketing areas. But these are always connected to the overall big picture, which is human & politics. So this workshop [on Agonistic Democracy, Design and the Environment] gave me basic outlines of how I can use my profession on solving problems of society and earth.”

In addition, however, many of the respondents looked at other than substance matters. A transdisciplinary approach, large real life challenges, learning-by-doing, and pushing the boundaries of the field of design in general were cherished:

“There was so much I learnt that week, skill wise, group dynamics, and about myself. Working together over the program boundaries is something that I think should be more encouraged”

Quite a few also reflected on the design process – of developing curricula through prototype-courses.

“Create a common shared experience and knowledge through action and practice it is probably the biggest lesson I learned during this week. And it's very powerful. Making things, do something, even if almost irrelevant for the final result, can create a shared

knowledge in the team that can boost the design process making the team members aware of the goals and save a lot of time that would be probably spent in talking and discussing to find agreements or make hypothesis. A sort of team reflection-after-action that seems to work pretty well [...]"

A broad model like the Prototyping the Future –program has at least two challenges. Firstly, massive exercises like the PtF require huge efforts from many in the faculty, arranging not only the new courses, with all the logistics they involve, but also the structures in the existing curricula which make it possible to try such experiments. To try this kind of model also needs a very strong feel of collegiality within a school, and a shared wish to develop the curricula. The UID is a fairly small school with a very committed faculty and a culture of developing activities, which made an exercise like the PtF possible. Secondly, the effects of such an effort are sometimes intangible and difficult to measure. Much of the learning of the PtF was distilled to incremental change, which happened within the existing programs and their curricula. Only one entirely new program, Design Connections, was ever founded based on the immediate learning from the PtF.

Despite these challenges the PtF was still a very positive exercise. The fact that everyone was included in the development improved the overall commitment of students and faculty and also lifted many practical challenges within the existing model, which were then possible to approach together. The concrete prototypes of the potential new areas made strategic discussions more to-the-point, and a lot more efficient. They were also very good in quickly ruling out what was not wanted in future curricula. The PtF also brought many new ways of working, which were found during the week-long courses.

Due to the challenge of implementation, many design universities have done this prototyping by initiating one entirely new program. Insights from this program have then been used to inspire other curricula development. Jamer Hunt (2012,6), the founding director (2009-2015) of the graduate programme in Transdisciplinary Design at Parsons the New School for Design, says that "when designers are no longer shaping objects, buildings and letterforms but processes of innovation and change, the rules of the game and the terms of engagement must evolve as well. These transformations are forcing designers to reconsider the boundaries of their own design practices. Traditionally, design professionals have been educated for, and have operated from within, disciplines. [...] The shifting contexts of design practices are now causing these certitudes to fracture and fragment. More frequently now, designers find themselves engaging with entities that range from government entities to food systems and public health organizations".

Just as in prototyping a product or a service the design curricula prototypes help in exemplifying what the curricula change would be about, and in a participatory design way give the users an opportunity to reflect in action and a shared starting point to discuss these possibilities further. The challenges with this approach are the same as with other prototypes; even the greatest of prototypes does not on its own ensure that the final outcome is great. A lot of development is needed after the initial idea has been verified,

including commitment and resources from the university and its faculty, before the insights have been structurally integrated into the larger picture.

5.2 Forming a new university – and then encouraging people to prototype

Finland, a small country in a big global societal shift, was in the 2000s facing national challenges of declining industries, aging population and global competition. New solutions were needed. Yrjö Sotamaa, then heading the University of Art and Design Helsinki, presented an idea in his opening speech for the academic year 2005 – the innovation university. The government cherished the idea of an innovation university, and a more concrete plan for the establishment of a new university was presented in February 2007, in the memorandum of the working group led by Secretary of State Raimo Sailas. The preparations for the university began later the same spring, when Prime Minister Matti Vanhanen included the new university into the Finnish government programme. The idea was to create a new innovative university merging science and technology, design and art, and business and economics.

The objective of the Finnish Government was to develop an educational and research agenda that could respond to the challenges of globalisation, changes in the industrial structure and working life in Finland. The goal was to advance the welfare and competitiveness of the Finnish nation as well as to support and nourish culture, creativity and education. A central part of this reform was a new law, the new Universities Act (1.1.2010), which separated universities from the state and made them legal entities under public law or foundations under private law.

After the initial decision to form a new university altogether 500 members of the universities that were to form Aalto University were involved in the preparations. Ideas were shown and discussed, processes planned, and different development possibilities were designed and scrutinized in transdisciplinary working groups. Many of the specific issues also involved an even larger part of the community. For example, a total of 1 600 suggestions were received for the name of the new university in spring 2008.

Aalto University was formally created in 2010 through a full merger of three universities: the former Helsinki University of Technology, the Helsinki School of Economics and the University of Art and Design Helsinki. A large endowment fund (today worth over 1bn euros) was created through private and public donations, and the government annual funding was initially increased.

The creation of an entirely new university allowed for new bylaws, structures and approaches. A new tenure track career system was introduced in 2010, and by 2014 more than half of the approximately 400 professors were new recruits to this track. This made it possible to attract new talent, thoughts and ideas, as well as increase the level of internationalism. The initial Aalto strategy in 2010 set out to achieve higher quality, multidisciplinary and internationalisation. In 2014, the University has four competence areas and three multidisciplinary themes that link them.

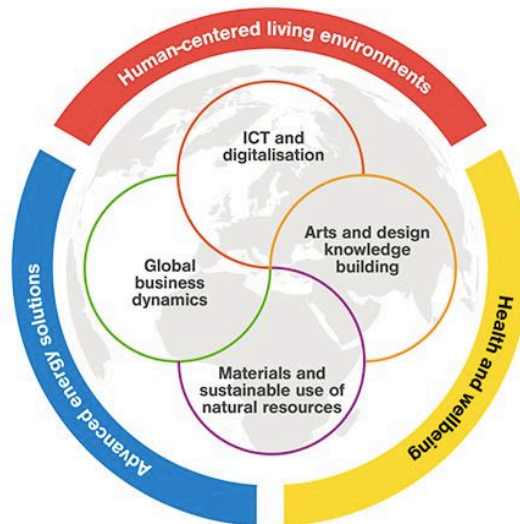


Figure 3: The competence areas and multidisciplinary themes of Aalto University in 2014 (Aalto University Annual Report 2014, 16)

Transdisciplinarity and student or faculty-based experiments have been encouraged during the whole period of the existence of Aalto. The very first year a call (with additional funding) for transdisciplinary research resulted in research initiatives like *AivoAalto*, combining brain researchers with the film department. Quite a few initiatives have also been generated by the students themselves, such as many of the entrepreneurial activities, like the Aalto Startup Sauna or the start-up event Slush, which in 2015 has grown to a mass-event bringing together 15000 attendees, with more than 1700 startup companies and 800 investors.

All the different parts of education that can be prototyped; the curricula, the structures, the managerial models etc. clearly illustrate that the situation is more complex than what first meets the eye. Donald A. Norman suggests (2011, 35) that one successful way to address this complexity is through a conceptual model. This conceptual, or mental, model as he also calls it, helps us in transforming complex physical reality into workable, understandable, mental concepts. Many of these initial projects or prototypes at Aalto have worked as such conceptual models – exemplifying what education and research collaboration could be in the future.

Although a designerly approach has been used to transform the university as a whole, many of the transdisciplinary activities also include design as a subject. New educational programs with a strong design component have been formed, such as joined master programmes in Creative Sustainability and International Design Business Management (see <http://acs.aalto.fi> and <http://idbm.aalto.fi>). Research groups, programs and summer schools have been formed in areas such as ChemArts, where chemists and textile and fashion designers are working together for a design driven world of cellulose (see <http://chemarts.aalto.fi>). Collaborative platforms have been developed, and the Design Factory concept (<http://aaltodesignfactory.fi>), bringing people together for experimentation, prototyping and interaction, has spread to ten universities around the globe.

Transdisciplinary labs include areas such as Biofilia, combining biology and art (<http://biofilia.aalto.fi>). At the same time research within the design field itself has grown and deepened, and currently the design department hosts seven research groups (<http://design.aalto.fi/en/research>). Design is seen as increasingly important within many of the fields in Aalto.

To see the societal impact of such large university changes will take time, and the Aalto University is still a fairly recent experiment. What we can see despite the short timeframe, is that the big bang of forming a new university was followed by a lot of bottom up activity; groups, labs, and collaboration spaces; that would be very unlikely to have occurred without the change the merger created and the participatory approach that was encouraged. The new university, with its new initial funding, also made it possible to achieve a large intake of new talent with new ideas.

The Aalto University set off with an innovation agenda, tied to the Finnish innovation policy, but other universities have been developing with different agendas. Arizona state university reconstituted its curriculum, organisation and operations through a deliberate design process (Crow 2015). Their target was a broad socioeconomic inclusiveness in their student intake, discovery and knowledge production as well as maximisation of their societal impact.

5.3. Innovating entirely new educational solutions

Examples of reforming curricula within universities, and mergers of existing universities, naturally poses the question whether these changes will be enough or if entirely new forms of education should be created, just as Bauhaus in its time.

We have seen new openings in some design fields. In interaction design the Interaction Design Institute Ivrea in 2001-2005 and the following Copenhagen Institute of Interaction Design was founded in 2006. These, however, have so far been rather small and targeted towards one specific field of design. Outside design more radical experiments are occurring, like the Minerva Schools of KGI, an experimental university in San Francisco, which promotes a hybrid on-line learning model without a traditional physical university.

These projects often face challenges in resourcing and institutionalisation, and sometimes have difficulties in creating processes and structures that last beyond the initial influential people. Just as the Bauhaus did, the impact of these entirely new players is not only through the education and research they produce, but also in how they influence the existing schools and universities around them.

6. Looking forward

Education and design is under pressure to change, and different strategies have been used to achieve this change. Going back to Gibbons Mode 2 knowledge production, we can see that within design education many of his five attributes are currently forming. To produce knowledge in the context of application, be it a single use-case or a larger, wicked problem, has been the prevailing mode in design for some time (see Heskett 1981, Buchanan 1995).

Now, however, the specialist areas within design are being opened up and borders between practices become blurred. Transdisciplinarity and diversity in groups is appreciated and the social accountability and reflexivity has increased, as well as a larger social, political and economic relevance.

Through the examples we have seen that a participatory design approach has been useful in developing universities and design curricula. The shared experiences have made the development possible, and the broader participation has increased the commitment to the change beyond the initial decision makers. This approach, involving faculty, staff and students on a large scale, might also relate to the fact that these examples were conducted in the Nordics, where a very flat organisation and low hierarchies are the norm. The active involvement of the students; in developing new ideas, in creating new ways of learning and doing, and in creating themselves an education that will be adaptable for future changes, also helped in looking forward rather than backward.

Interestingly, many of the more radical ideas also helped in improving the existing activities incrementally. The new concepts highlighted challenges in areas such as joint time-tables, processes and practices. In developing the new much of the old was also improved.

However, the examples also showed that great design methods and compelling prototypes of future possibilities alone are not enough in achieving change. Change needs people who want to achieve change, and who are passionate about developing their field further. This can give great results, but can also be exhausting for the faculty. It is a lot easier (and more comfortable) to just keep doing what you do than to develop new approaches. In both cases there were also challenges in moving from isolated prototyped examples to changing the culture and content on a larger scale – in making the new approaches the norm rather than exceptions. A fair amount of additional resourcing and political willpower was also needed in making this happen.

As these prototypes of new educational approaches are now appearing in the design community around the world, the broader challenge is the same as with design research in general; how do we ensure that the new knowledge and insight gained through these prototypes are cumulated to a larger body of knowledge and shared within our academic realm? Examples in many countries have involved countless hours of hard work – as design researchers we need to build on this knowledge and develop our fields further. Can we change culture and content on a large scale and cherish new approaches rather than view them as interesting exceptions?

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