
Design School
and the Industry Turn
19 June 2017
the
DESIGN
MUSEUM

Welcome to the Design Museum

Welcome to the second of three summits in Design School: the Future of the Project, a series supported by the AHRC and a partnership between the Design Museum, Imagination, Lancaster University and Charles Sturt University, Australia. Today's event explores the critical and contested relationship between the Design School and Industry. At the first summit, held at the former Design Museum on Shad Thames, we debated how the content, pedagogies, structures and remits of the Design School might adapt to a fast moving context. Since then the context for the series has changed dramatically, from fast moving to what Ezio Manzini and Victor Margolin, in their Open Letter to the Design Community, call "*difficult and dangerous times*" where design must "*stand up for democracy*". This summit, Design School and the Industry Turn, questions how design education can best meet the challenges of the loss of "*fundamental freedoms*" and of design's role within the creative and manufacturing industries in the UK and global economies.

Are design schools, for example, best placed to create the people industry require for their future needs, and if so, how? Should design schools produce job-ready, innovative, analytical and inventive problem-solvers as industry demands? How should design schools respond to the seemingly increasing automation within industry? Manzini and Margolin, call for "*diverse actors who can shape our present and future worlds in fair and inclusive ways*".

Those in the room today are no doubt familiar with the statistics associated with design and the larger creative industries sector, but they are worth restating: the creative industries together form a key sector of UK industry, generating around £90billion per annum and making up over 5% of the UK's economy. The creative industries are one of the fastest growing sectors of the British economy, growing at more than twice the rate of the economy as whole. The creative industries directly employ some 2 million people and are responsible for nearly 10%, or £20 billion, of the UK's annual service exports. In design, they span many different disciplines, from video-gaming and product design, to architecture, automotive design and fashion. As the workforce needs of industry evolve, the creative industries will be critical to the success of the wider future economy. But is design education meeting those needs? The government's *official Tier 2 Shortage Occupation List 25* lists a high percentage of design jobs – how can HEIs work with schools and industry to mitigate future skills shortages and act as a pathfinder to other sectors on creating the right environment for a sector to thrive?

These questions and further provocations will be shared and debated today in the new Design Museum, a testament to founder Sir Terence Conran's absolute belief in the interconnectedness of design and industry and the central role of education therein. Cognisant of this context, the third summit will then pull focus to the role of the cultural sector vis a vis the design school. We look forward to welcoming delegates back to the museum in November to continue the conversation.

Dr Helen Charman
Director Learning and Research, The Design Museum

Paul Rodgers
Professor of Design, Imagination, Lancaster University
Arts and Humanities Research Council (AHRC) Design Leadership Fellow

Craig Bremner
Professor of Design, Charles Sturt University

Schedule

10:30	**Welcome and Introduction** Welcome from Deyan Sudjic, Design Museum Director Dr Helen Charman, Director of Learning and Research, Design Museum Paul Rodgers, Professor of Design, Lancaster University Craig Bremner, Professor of Design School of Communication and Creative Industries, Charles Sturt University
10:45	**Will Holman :** 45 minute presentation followed by question and answer session.
11:30	**Luis Cilimingras :** 45 minute presentation followed by question and answer session.
12:15	**Nelly Ben Hayoun :** 45 minute presentation followed by question and answer session.
13:00	**Break for Lunch:** Please see attached leaflet for locations options.
14:00	**Chiara Alessi :** 45 minute presentation followed by question and answer session.
14:45	**Rebecca Cain :** 45 minute presentation followed by question and answer session.
15:30	**Tea and coffee break;** Tea and coffee available outside auditorium
16:00	**Peter Lloyd Jones :** 45 minute presentation followed by question and answer session.
16:45	**Final discussions and closing comments** Plenary panel with all the speakers – question and answer session.
17:30	**End of summit** Please depart via main entrance.

Speaker Biographies

Chiara Alessi

Chiara Alessi (Verbania, 1981) is a journalist and curator in the field of design. She writes for many of the major magazines in this area, such as “Domus”, “Interni” and “Klat”. For several years she has been studying the new Italian design culture and its impacts and implications. On this subject she lectures in some of the most important schools and universities. Recently she has published “After the '00s. The New Italian Design” (Editori Laterza, 2014) and “Design without designers” (2016), an essay and survey about the “other” jobs in the Italian design. The independent video documentary “Travelling commonplaces and special trades” is dedicated to it.

Nelly Ben Hayoun

Nelly Ben Hayoun is a French designer, an award-winning director and experience designer; she works with scientists and engineers to devise events and experiences. Nelly is also an exhibitor and keynote speaker who has worked with museums and design centres across the world.
In 2013, Icon Magazine nominated Nelly as one of the 50 international designers “shaping the future”. In 2014, Wired Magazine awarded her with a WIRED Innovation fellowship for her work to date and for its potential to make a “significant impact on the world”. In 2015, Nelly was nominated for a Women of the Year Achievement Award. Also in 2015, she released her feature film Disaster Playground. The film is based on an investigation of emergency procedures for disasters such as earth-bound rogue asteroids. In 2016, she began work on her next project: feature film, digital platform and exhibition entitled “The Life, the Sea and the Space Viking”. Nelly is a member of the International Astronautical Federation, Space Outreach and Education committee.

Rebecca Cain

Rebecca Cain has a background in design, with a First Class degree in Industrial Design & Technology and PhD in user involvement in the design process, both from Loughborough University. In 2009 she was awarded a prestigious EPSRC Challenging Engineering fellowship to build new research capability in improving the design of healthcare environments through user involvement in the design process. Rebecca's innovative multi-disciplinary research programme 'Participation in Healthcare Environment Engineering' brings together design and engineering, with architecture, psychology, healthcare and ICT, and involves working in close partnership with the NHS, patients, architects, designers and engineers. Her research has created improvements to the healthcare environment in areas such as the Emergency Department, the hospital soundscape, wellbeing centres and waiting rooms. Rebecca has gone on to lead a broad portfolio of projects within Experiential Engineering, all with an emphasis on placing users at the heart of the engineering design process. Rebecca is a co-investigator on the AHRC funded project 'Creating Sustainable Innovation through Design for Behaviour Change' in collaboration with seven UK and European universities. Rebecca spent a number of years researching 'positive soundscapes' and the role that the perception of sound can play in peoples' experiences of environments. This work, initially within the urban environment including the future impact of electric vehicle sound has now expanded significantly into healthcare and the concept of the hospital soundscape. She has also worked on projects with Jaguar Land Rover around issues related to driver behaviour and the human machine interface of the vehicle.

Luis Cilimingras

Luis Cilimingras is IDEO London's managing director. He is passionate about how organisations embrace creativity to feel more confident about their growth/impact/future. Since joining IDEO, Luis has led relationships in diverse sectors including mobility, retail, healthcare or pharmaceutical. Before returning to London, Luis spent a year in Peru, starting an innovation studio for Intercorp, a large national conglomerate, called La Victoria Lab. Its mission: to create new products, services and experiences for the country's emerging middle class. An engineer by training, Luis was Fiat's brand manager before coming to IDEO, helping to launch the iconic Fiat 500 in Europe. He then led digital innovation at Fiat Group, overseeing the development and launch of Fiat eco:Drive, the first mass-market connected car app. Luis has received numerous awards for innovation, communications and technology, including the Grand Prix at the Cannes Lions creativity festival and spoken at conferences including TED Active.

Will Holman

Educated as an architect at Virginia Tech and the Rural Studio, Will Holman is the Executive Director of Open Works, a makerspace that opened in central Baltimore in 2016. He is the co-founder of the Industrial Arts Collective, their mission is to be an online resource for communication, collaboration, and general education on all the amazing people living and working in Baltimore. Will is author of Guerilla Furniture Design, which is an innovative guide too dozens of strategies for upcycling scrap cardboard, metal, plastic, or wood into dependable shelving units, sturdy tables, and fun lamps. Most recently he has contributed two essays: The Toaster Paradox and The Open Source Object to the Open Making Manifesto: Field Guide in conjunction with the Open Desk exhibit at the Vitra Design Museum.

Peter Lloyd Jones

Peter completed his Ph.D. in cellular and genetic pathology at Cambridge University, followed by post-doctoral fellowships at UC Berkeley and the University of Toronto. In 2005, Peter became a tenured Associate Professor of Pathology and Lecturer in Architecture at The University of Pennsylvania.
Peter Lloyd Jones is an award-winning cell and molecular biologist and inventor, whose discoveries have uncovered fundamental mechanisms in embryogenesis and human disease, including breast cancer, lung development and pulmonary hypertension. Peter’s work constantly seeks and uncovers new solutions to complex problems in biology, medicine and design via extreme collaborations with diverse individuals from multiple fields, including mathematics, computation, chemical engineering, and industrial, fashion, textile and architectural design. Peter is currently the first Associate Dean of Emergent Design and Creative Technologies at The Sidney Kimmel Medical College at Thomas Jefferson University (TJU), where in 2013, he became Executive Director of MEDstudio@JEFF; an anti-disciplinary research and education unit which is the first of its’ type within a US medical school, and is focused on discovering new and dignified solutions in healthcare using approaches deeply rooted in empathy.

Papers (In alphabetical order)

Chiara Alessi

School, Design, Future

Design is a relatively young discipline. In Italy, the first universities to offer design faculties were only established in the new millennium. This radical and paradigmatic development came about when the 100-year old Italian Instruction noted the birth of a new profession that was increasingly taking on the contours of the designer. In the 1980s, Domus Academy – a school strongly supported by the founders of the *Domus* magazine to welcome the new design studio and its profession – was born in Milan, home to modern architecture, with the idea of forming the designer of the future, which for the first time was distanced from the architecture profession. Thanks to the increase in the number of courses devoted to design schools around the world since the 1980s, more and more young people are becoming trained in a discipline once reserved for a niche field of specialists.

The increase of students preparing for this new discipline has resulted in a change to the profession's DNA: for example, the number of highly-skilled female designers entering the profession is increasing, while the the average age of practicing designers is dropping dramatically. The rapid growth of our cities has meant that the design industry is increasingly moving out of the centre to new, emerging micro-centers on the periphery of our urban centres, resulting in the emergence of new design districts with their own distinctive, specific identities. Andrea Branzi, one of the strongest advocates of the Domus Academy project, has spoken of "design as a mass profession" in this regard. In fact, it would make more sense to think of design as made up of a myriad of different and fluid identities.

Today, the term 'mass' has assumed negative connotations as the scale of production and consumption reaches an ever- increasing number of individuals. This has resulted in an urgent and perhaps inevitable desire within the design profession to search for a new identity. In *Design, When Everybody Designs,* MIT professor Ezio Manzini argues that experienced designers should be prepared to react, interpret and translate widespread design questions as proposed by non-designers in order to effect meaningful social change. Breaking traditional educational boundaries does not only mean getting out of the classroom by bringing design to the streets and encouraging closer links between students and factories or craft workshops, but also breaking away from the tight boundaries of the discipline by encouraging design to enter fields previously neglected by the industry: hospitality and identity, transport and communications logistics, disease, childhood and so on. Given the ways in which design is increasingly about diversifying product offers, supporting identities and building mobile technologies around the individual (some of the current trends within the industry), design schools should educate future designers to take this multiplicity into account – in other words, trying not to satisfy everyone, but to design for individuals, in their own way. It is for this reason that design education should adopt the motto of Kurt Weidemann, who argued: "I have as many teaching programmes as students." This is at the forefront of learning.

Then there is learning how to learn, one of the key principles underlying Montessori's theory of education (a bastion of Italian twentieth century culture), often misunderstood but never more important than today.

This, too, can be taught: providing students with a welcoming but critical environment, one that is not only flush with curiosity and stimuli, but also questions and doubts, giving them the ability to locate and select tools, make scraps, and produce options. Learning beauty through beauty.

David Foster Wallace, one of America's greatest writers of the last twenty years, wrote: "Genius is not reproducible. Inspiration, however, is contagious, and multiform - and even just to see closely, the power and aggressiveness made vulnerable to beauty means to feel inspired and (in a fleeting, mortal fashion) reconciled". Thus the purpose of design school is not to cultivate personalities, but to educate talented people, to teach them to be critical, to use their teachers as a means, to accept their mistakes and to raise questions, but without ever forgetting their purpose.

Rebecca Cain

How can design education work with industry to meet the changing needs of the market?

For over a decade I have worked as a human-centred design academic within WMG, a large, applied manufacturing engineering department at the University of Warwick, which does everything in collaboration with and for the benefit of industry. My position on design education is shaped by my experiences of how engineering education has responded to the changing needs of industry, and through my own emerging identity as a 'transdisciplinary designer'.

The role of design has changed and moved beyond domain specific specialisms, such as industrial design. 21st century designers must now think about the societal contexts around why they are designing, define problems and consider issues such as ethics and sustainability. Increasingly people with these skills are taking up roles in government and other organisations. Industry therefore needs designers more than ever before, and design education needs to change quickly to keep up with this demand.

The explosion of 'Digital' – or business transformation is also growing demand for in-house design thinkers. With the shift to the experience and interaction aspects of product and service innovation, global management consultancies are now developing their own in-house capabilities and buying up design agencies. These businesses need people who can look to the future, strategise and anticipate the potential impacts of change. So organisationally, design moves closer to other internal teams and also closer to customers – which in turn creates the need for new types of designers who can operate at the interfaces of disciplines, including business, technology and customer-focused functions.

Industry is calling for a new breed of 'transdisciplinary designer' – people combining specialist domain-specific skills but also more broader areas of knowledge in subjects such as business, psychology, social sciences, technology and science who have the aptitude to work in multi-disciplinary teams. There are high expectations for these new designers, and we need to think carefully about how to educate people with the right blend of specialist and generalist skills and the willingness to step outside their disciplinary comfort zone.

I reflect on my own experience here, and the challenges in doing research and teaching across disciplinary boundaries. I spent much of my early academic career having an identity crisis – was I a designer or an engineer, or a designer working in engineering? I now comfortably call myself a 'transdisciplinary designer'. Having trained as an industrial designer, followed by a PhD about co-designing, I then spent over a decade based in a manufacturing engineering environment. Being 'the only designer in the room' I tried to (and still do) teach engineers things like how to think about the emotions of the people impacted by their work, to get them to engage with real people rather than testing everything on themselves, and to fully understanding the problem before leaping to a technical solution.

It's exciting to work within this "experience designer in engineering" space, called "Experiential Engineering". I have built a highly multidisciplinary team of researchers over the years from design, interaction, HCI, psychology, nursing, physiotherapy, business, ergonomics and philosophy – and all our projects were created and executed in collaboration with industry. We had successes but it has also been challenging at times to find a common language between our respective disciplines and industrial collaborators.

So how should we educate people to be transdiciplinary designers with the skills which industry require? For this we need to reflect on ourselves as educators – what are we bringing to this? We need multi-disciplinary education teams, and education leaders with a transdisciplinary mindset. As I have learnt from

research, it is not just a case of having the component pieces of expertise – they need to be joined up and mashed together. The challenges for transdisciplinary working come around the overlaps and intersections and different languages that come with blending different disciplines - managing the tension between the specialist and the generalist.

From my personal position as a design educator based in engineering – and specifically in WMG – an organisation which offers education from age 14 through to undergraduate, postgraduate, professional, executive and apprenticeships, I think that engineering education has been quicker to respond to the needs of industry and changing markets in terms of the choice and flexibility of options across the career stages. Providers of design education could learn from this. However, I do not think that engineering education on the whole has really embraced the opportunities to become transdisciplinary, and in this respect, Design Schools could be innovative leaders in this space – if they are up for the challenge!

Of course, design education already has mechanisms to work with industry and many providers have been doing so for years, through internships, placement years and sponsored design projects, although mainly on undergraduate and postgraduate programs. Inspired by the vast range of education offerings I have seen at WMG for engineers, I think that new opportunities for the Design School lie around enriched education and life-long learning – flexible, accessible education for people at different career stages – from apprenticeship level to senior executives.

Another space to be innovative in design education is with industry-sponsored design doctorates to generate the next generation of industry leaders. WMG offers the Engineering Doctorate (EngD); a practice-based, portfolio alternative to the PhD, combining research and industrial experience. Academically equivalent to a PhD, it has a wider, more practical focus and an emphasis on innovation. The flexibility of the EngD means it can be started at different career stages, and be conducted while working in industry. So perhaps we need a new Doctorate in Design (a DesD?), inspired by this model?

We have an important responsibility to train the next generation of designers and leaders, particularly the transdisciplinary kind. Design schools within multi-faculty universities are ideally positioned for this. But it is a competitive marketplace, and if new laws are passed, more private universities with degree awarding powers will emerge. How long is it before we see forward-thinking industry providers entering the marketplace and offering their own degrees in design, the same way that Dyson just set up a new university to train engineers (emerging debt-free) at its UK headquarters?

We need to be better at listening and responding to the needs of industry, offering more choice, flexibility and value for enriched life-long learning. We should also be co-designing education at all levels in collaboration with industry. Finally, we should practice what we teach, be less disciplined and more creative and adventurous in how we educate the New Designer.

Luis Cilimingras

The designers we are looking for

Opening up the toolkit

Corporations and the public sector are waking up to the potential of design's creative approach not only to develop products and services, but also to creativity as a key quality to build more resilient organisations for the ambiguous world out there. As the designer's point of view makes its way up in organisations, designers are realising that in a corporate environment their core toolkit is not sufficient to drive impact. Here's feedback one of our senior Project Leads received from his client, in what otherwise was a startling appraisal:

"He should start to develop a more nuanced understanding of the commercial aspects of project outputs, I understand that design needs to start with the customer, but commercial justification is a critical part of driving forward and executing on project deliverables within any large corporate business."

Developing design entrepreneurs

Another growing area of demand for design skills are start-ups, corporate ventures and more established tech players. Typically designers are working alongside product owners/managers with a business background and technologists with engineering backgrounds. In these environments designers are required to be fluent with a wide set of skills like design research experience, service, UI and UX design while also being comfortable adopting new processes like lean start-up or agile techniques. Perhaps more importantly, designers need to develop an entrepreneurial mindset, learning to present the value of their work in a wider, more strategic context, to measure the quantity of design that is right at each stage of development and know the challenges associated with launching products to market. As an example, none of the top graduates that we had selected in a recent process had experience working in a "live product".

IDEO has traditionally hired engineers and business graduates to work alongside designers and build on each other's perspectives. Today we think that might not be enough, as business people and technologists adopt a design-based, creative approach to develop new products and services, if designers want to keep leading design work, they ought to develop a finer business acumen and be comfortable with different processes across the strategy-concept-live spectrum.

In that sense here in London we are experimenting with new learning and development models for our design community. We have partnered up with London Business School to teach design thinking to their cohorts, in exchange for business and strategy executive courses for our senior designers. That also opens them to a new crowd and to empathise with the desires and aspirations of who often end up being our clients.

We are also increasingly partnering with digital product studios and developers to learn from each other and collaborate as projects move to be scaled up.

To us is very clear that the challenges we want to be working on, can't be solved by IDEO alone.

How might we develop an entrepreneurial mind-set in design students?

How might we encourage design school teams to experiment with different toolkits?

How might we evaluate design students for their capability to collaborate with non-designers?

Designing for systemic challenges

As IDEO's CEO Tim Brown outlined in a recent article, it's time to apply our collective design practice to greater challenges, namely:

1. Serving the needs of the global poor

2. Designing new approaches to health, including aging and the end of life

3. Designing healthy and profitable food systems that can serve the needs of all

4. Designing citizen-centered government services

5. Designing the future of our urban communities

6. Anticipating the opportunities and challenges of over-the-horizon technologies

7. Designing the future of work and the corporation itself'

These complex, systemic challenges are creative challenges. They require a constant iteration between the big systemic picture and the small, human sized intervention. The interdependencies between the elements of the system are often hard to map, calling for a creative, empirical approach rather than the prevalent exhaustive analytical approach.

Our work in complex systems like healthcare and education and more recently with the Ellen Macarthur Foundation on the Circular Economy has been pushing the versatility of our 'classic' design thinking process and we have been asking ourselves what the design process looks like if it's a more continuous loop (like software) without a linear start and finish, if we are designing entire system strategies (and not just user or single business strategies), with embedded intelligence that spawns new data and services, all of which stretches our interdisciplinary capabilities in exciting new directions.

Change the measure of success - 'never finished'

As we embrace a design approach on this complex, systemic challenges tomorrow's designers and creators will be well versed in developing and launching products and systems that are in a constant state of change. Their outputs will be designed for a life of ongoing iteration, powered by smart data capture and both passive and active user input.

Impact is to be judged by participation of future users as much as the present and success as a designer will be as delayed and drawn out as it is instant.

How might we teach tomorrow' students to design not just a product but the supporting systems that will allow it to continue to evolve beyond its 'first use case'?

How might we change the measure of success towards participation, not perfection?

Tomorrow’s design teams.

Tomorrow’s design teams will go into industry with a new set of muscles to design in an ecosystem context.

Business minded, technical and creatively confident, they will be set up to operate and influence boardrooms, policy labs and back-end operations and technical teams.

Influence will trump inspiration and strategic thinking will be a prerequisite of all ‘creatives’.

After emerging from a deeply collaborative education, consisting of exposure to business, technology and ethics, designers will share a common set of values to tackle society's biggest challenges:

- Creatively Curious
- Endlessly Adaptive
- Highly Collaborative

Nelly Ben Hayoun

Designers as mythologists: The University of the Underground

I propose to discuss Design School and the current Industry Turn, using the example of The University of the Underground as a case study. The University of the Underground is a university and not for profit foundation that I founded this year with multiple 'partners in crime', experts in the music, design, film industries. I will discuss how this forward thinking, future facing design school and its policies can work-or not- alongside the agenda of private companies.

The University of the Underground promotes unconventional research practices and aims to teach students how to engineer situations, to design experiences and events to best support social dreaming, social actions and power shifts within institutions, companies and governments.

The University of the Underground is a not for profit Foundation registered in Amsterdam. Our educational programme is a two-year full-time Masters, hosted by the Sandberg Institute and we teach in the underground of urban spaces; under the nightclub of De Marktkantine in Amsterdam and beneath the Village Underground in London. Both venues have partnered with the University of the Underground and donated their time and space to the university for the next 100 years.

We aim to provide students with the tools and means to learn to understand their profession as the increasingly multi-faceted and malleable role it assumes in today's world – where designers enter the realm of authors, directors, politicians, planners, dreamers, activists, mythologists and musicians. Students are encouraged to use their own voice, style, tone and aesthetics as manifested in final outcomes of performative product scenarios, products embedded in the context of the built environment and the institutions, or the tangible experience and its implications now and in the coming years.

In the University of the Underground, we believe that it is most urgent to equip young designers with the learning that allows them to use their knowledge of the material world within the navigation of governmental systems, institutions and power structures. This multiplied via the encouragement of applicability of the modelling and physical existence of students' dreams, beliefs and myths. Ultimately epitomized in social dreaming becoming the fuel for social actions. Embracing the textuality of the punk tradition, there are no more heroes instead replaced with the urge to democratise the experience of the institution. If nothing else, experiences and events make you feel alive and connected to the world around you. It is this principle within this realm that is experimented with constantly in the University of the Underground.

The proposed outcome for our participants will allow them to view their creative practices from a fresh unexpected perspective and extend it in scale, scope and modes of engagement into the territory of architecture, systems thinking, critical design, sociology, philosophy, music, film, performance of politics, and experiences. Students are invited to observe, explore, collect, examine and extrapolate the ordinary in institutions through the design of products as events, experiences, systems, film, and musical reenactments.

Through this diversity, the institution urges its students to go forth into societies' institutions – companies, health services, government departments etc – and to use their creative drive to change these institutions

internally and allow them to serve society better, rather than have their creativity crushed. Via the provocation of events, projects and experiences in these institutions, a fascinating domino effect occurs which forces others who work within these monolithic entities to think and act differently. Conclusively, their clarion call spreads: the applicability and practicality of creative urge to action change on a gradually growing scale. Idealistic maybe, ambitious certainly.

First year students work on short 4 to 8 weeks briefs, workshops, field visits, practical exercises in collaboration with institutions, experimentation, topical content development, voice/style development, identification of preferred media/mode of production. Then students develop design events, products, experiences, political outcomes and experimental actions/experiences in collaboration with institutions and experts. In their final year students develop their own agenda, using their own voice, at a site either within an institution – or without.

As a 'creative resistance', a problematic but satisfyingly alarming term, the University of the Underground seeks to teach how to engineer situations, to design experiences and events that best support social dreaming, social actions and power shifts within institutions, companies and governments. In order to do this, The University of the Underground is lead by a multidisciplinary team of 'dreamers of the day', diverse educators and practitioners who believe that a positive inspiration and disturbance to the current cultural and educative system is required to best support the young generations in their creative and political endeavours.

Students are provided with scholarships to cover their tuition fees for which the University of the Underground relies on donations from philanthropists, individuals and corporations sympathetic or inspired by their manifesto-like actions.

The University of the Underground has an advisory board selected on the basis of their skill sets, experience and knowledge in education, scaling up globally or expertise in design, experiences, music, film and many other disciplines.

If the University is to exercise its own narratives, semiotics, systems of meanings, its own 'type of speech' which will grow externally, it must resist its language as reclusive from the public eye, must not be shackled by deception that it is another limited, cul-de-sac perspective.

To conclude the University of the Underground, the institution, has a warmth and ambition both in its internal operation and the technicalities of its anticipated external influence on entities and spectres. This hopefulness, though well received in artistic, academic and public spheres has also highlighted skepticism and criticisms of toxic neo-liberalism, while opening up a much-needed conversation on hypocrisy and funding in higher education.

As the University of the Underground prepares to commence its first academic term in September I will use this opportunity to dismantle and interrogate the foundation of the university; looking at its organisation: its aims, its syllabus and funding structure, its advisory board and links to private business, and finally some of the diverse reaction from the press.

Will Holman

Artificial intelligence, machine learning, and automation are predicted to wipe out anywhere from 9 to 47 percent of all jobs over the next twenty years. If you split the difference in predictions, there is the potential for 25% of jobs to disappear, which is an unprecedented lurch in the economy. Voice recognition has become commonplace, Amazon warehouses are now largely automated, and there are dozens of self-driving car startups vying to replace taxi drivers and long-haul truckers. In the next decade, the U.S. could lose almost 2 million jobs in trucking alone.

Design is predicted to largely survive automation since it is a creative discipline that requires (at least some) human characteristics to succeed. The professional practice of design generally follows an agency model: a principal or set of partners assisted by a crew of capable assistants that create work for clients. These firms usually follow a straightforward fee-for-service business model. However, the way we make, market, sell, distribute, and consume products is fundamentally changing, and the agency model of design has not evolved in parallel.

Instead, studios have taken half-steps. The use of freelancers, contingent workers, and unpaid interns has ballooned. Statistics back this up, as contractual and contingent workers are expected to be a full 1/3 of the American workforce by 2020[3]. Services like fiverr and Upwork are now Uber-izing graphic design services, a model that could conceivably spread to more regulated and complex disciplines like architecture.

Some see this as a natural neoliberal evolution of things – even a positive development. Technology has enabled everyone to become an agency of one, free to shop their talents for the highest price the market will bear. But instead of finding freedom as entrepreneurs, designers are finding themselves constantly in hoc to a series of rent-extracting digital platforms. Work is becoming perpetual, on-demand, and subject to constant crowd-sourced evaluation. Design school has long prepared students for the stability of working a partner-track job at a large firm – a path that is disintegrating in real time.

So how do we prepare students for this increasingly anarchic economy? As traditional firms consolidate, disappear, or give way to decentralized networks of workers, designers are going to have to find new ways to build viable practices. Technology can fill some of these gaps, but designers still need a place to find new skills, social capital, collaborators, customers, clients, and investors. Design schools have traditionally provided that scaffolding, but access to those resources evaporates on graduation day.

Makerspaces are the next evolution of this support system, providing low-cost access to tools, software, and education. They invert the current extractive sharing economy model – renting out one's own assets – by distributing the cost of expensive tools and technical expertise over a large user base. They bring together a diverse creative community, fostering collaboration and strong social ties. They educate the public in a wide range of hands-on and abstract thinking skills through project-based curriculums. In all of these ways, they act exactly like a design school. But instead of locking these resources away in an ivory tower, makerspaces take a similar set of conditions and put them in a diverse community context that is available to all.

However, the track record of makerspaces has been uneven at best. Their (relatively) widespread adoption only started about 15 years ago, and there is little consensus on sustainable business or organizational models. Despite rhetoric around inclusion and diversity, they have tended to attract a self-selected audience that is heavily male, white, well-educated, and affluent[4]. They remain unproven as generators of economic activity or genuine innovation. Makerspaces will have to evolve past hobbyist playgrounds and demonstrate diverse, resilient economic success to survive.

I now live and work in Baltimore, Maryland. Once home to the first American railroad and the world's largest steel mill, it is now a shrinking, segregated city with 16,000 vacant homes. In a way, Baltimore is a microcosm of these larger shifts in the economy. Once driven by huge factories, new inventions, and a deep-water port, the local economy has now shifted to a service-based model anchored by universities, hospitals, and a few large companies. But Baltimore is also home to 12 makerspaces, with membership bases ranging from a few dozen to over a thousand. The oldest of these spaces started in 2009 – a remarkable growth curve for a city of only 600,000. These spaces, and the people that use them, are the seeds of a new design- and manufacturing-based economy.

Ten years after I graduated from architecture school at Virginia Tech, I go to work every day at Open Works, a place that looks a lot like where I studied. There are 140 small workspaces – about the size of an office cubicle – along with 7 workshops, classrooms, a computer lab, and a café. We currently support dozens of design-based businesses and almost 200 members. Some operate on the agency model, like local architecture firms that have taken corporate memberships to build models and furniture.

Others are engaging with emerging, independent modes of practice that are yet unproven but have huge potential. One of our members is an artist that has appeared in several YouTube series with Adam Savage and has written for Make Magazine – designer as content creator. Another one of our members is a startup company that has engineered a new type of woodstove that eliminates soot emissions – designer as inventor. We offer contract services to outside clients, including local production of London-based Opendesk furniture – designer as distributed manufacturer.

At its core, Open Works is about democratizing the means of production. By extension, this means the democratization of design – and this is starting to create a dense web of interlocking economic, educational, and social activity. In the brave new world of work, this web of activity is providing the support to freelancing individual that the agency model once provided for their employees. Instead of a master-apprentice dynamic, makerspaces foster community as a model of practice. Ultimately, these horizontal, peer-to-peer relationships that reach broadly across disciplines will prove more resilient in the face of disruptive change, charting a path forward for design education, design practice, and the economic viability of design as a career.

Peter Lloyd Jones

Post-disciplinary action: why science and medicine need the design school

"To embrace design is to spark novelty, improve livability, expand opportunity, streamline productivity, leverage capability, and massage readability, but perhaps most importantly it is to engage humanity. And we do this best by being human ourselves" from DESIGN The Invention of Desire by Jessica Helfand, 2016

In 1910, The Carnegie Foundation released a study authored by Abraham Flexner, the aim of which was to review and reform the US and Canadian medical education system. Ultimately, "The Flexner Report" resulted in a singular and highly regulated system for medical research, training and practice that is still controlled by the American Medical Association (AMA), and advanced further by federally-funded research that supports basic biomedical and scientific research. By providing "An education in medicine that involves both learning and learning how", the report also helped to create essential specialization tracks and safety standards, while ridding it of certain gimmicks and quackery, Along with this, however, came an era of social, professional and cultural exclusion that was directly rooted in Flexner's personal beliefs, and his complete lack of training and experience in medicine, for he was a classicist. Flexner's prejudice resulted in the targeted closure of African-American medical academies, for example, an action that is still evident in the relatively low numbers of black medical doctors and scientists that we graduate even today. Another casualty was "complementary medicine" (e.g. osteopathy, chiropractic medicine, electrotherapy etc), eliminated simply because no one knew how it works. The medical arts and humanities were excised, and the profession became a mostly science-based entity.

Although we know that art and design can improve medicine, and that the practice of medicine is an art that can be elevated through good design, it is empirical knowledge that largely determines how we admit and train medical students. Encyclopedic quantities of facts are taught *en masse*, and tests are taken more or less on repeat for four years. What's more, the longer the student remains within the system, the lower their empathy for patients generally becomes. When they learn to look at art more deeply, however, empathy levels and clinical skills rise significantly. Similar increases in creativity occur when using the hand, versus a 3D printer for example, to make things. Fast forward to the clinic, where fully-trained doctors and other health professionals armed with massive datasets and advanced digital technologies conduct medical exams and treatments, most of which are nothing less than miraculous. Yet, according to a Johns Hopkins University report, "people dying from the care that they receive rather than the disease for which they are seeking care has become the 3rd leading cause of death in the US".

"Into whatsoever houses I enter, I will enter to help the sick, and I will abstain from all intentional wrong-doing and harm, especially from abusing the bodies of man or woman, bond or free. Now if I carry out this oath, and break it not, may I gain for ever reputation among all men for my life and for my art; but if I transgress it and forswear myself, may the opposite befall me"

The Hippocratic Oath (300-500 BC)

Here is the breakdown of that: 12,000 Americans die each year from unnecessary surgery, whereas another 7,000 lives prematurely end in medication error. 20,000 patients cease to be because of so-called "other hospital errors". 80,000 die unexpectedly from infection, whereas 106,000 pass on due to the negative effects of drugs. 250,000 thousand iatrogenic deaths occur in the US each year, and that is an

underestimate. How does this happen? The wrong pill is placed in the wrong mouth. Tests are over-ordered, and the scientific results second-guessed or ignored. The correct pill is given, but at the incorrect dose, or it produces an unexpected adverse reaction. Lives are needlessly lost to contaminated IV lines. Bone-fracturing shiny septic surfaces and beeping alarms aside, we all know what hospital design, from the gown to the fluorescent lights and food, looks and feels like. The quality of the patient experience is also riddled with inconsistencies and surprises. For example, most doctors choose to die at home peacefully surrounded by their memories and loved ones, whereas 75% of the rest of us will die in a beeping machine-filled, sterile environment, often alone and connected to one or more tubes. Other time and financial constraints imposed upon healthcare professionals now means that 23 seconds is the average time that a doctor will spend listening to a patient before interrupting them. Those and other factors may also explain why only 4% of cancer patients end up in potentially life-saving clinical trials. Although some of these defects may be attributed to time and technocratic pressures, they are mostly due to poor design on the one hand, and an inability to intuit and think swiftly in abstract ways, on the other. As a response to these problems, and recognizing that good design is good medicine, schools are purposefully including it within their core and elective curricula, an effect amplified by the adoption of innovation zones intended to inspire, catalyze and drive new invention and business. As with The Flexner Report, however, many of these efforts are dilettante-driven, and do not include design professionals as guides to their future. Instead, clinicians view designers as assistants rather than active partners, and exclude the possibility that each can serve one another.

So more than a century after their formal separation, MEDICINE and DESIGN are dating again, but in a place made much more complex by a society obsessed and easily swayed by social media, and one that is fueled by the rapid expansion of parallel gig-driven economies within which everyone is an expert. Pure scholarship and intellectual discovery for their own sake are increasingly considered both elitist and a poor return on investment, even within academies of higher learning. If one views the future of these academies through the lens of the near and distant past, however, it is possible to create equitable and highly productive educational models within which both professions can flourish to co-serve humanity, while retaining their core professional beliefs and values.

Creating a common language between medicine and design is one of the first steps in any ongoing or future collaboration. Understanding their distinct cultures is another, and is perhaps the biggest hurdle. The inability to take risks, a loss of autonomy, a fear of failure, and relegation within a top-down technocracy may explain why a single algorithmic methodology, originally designed as a business tool, has taken hold in medical schools. Design Thinking in healthcare is alive and well, but a side-effect of this simply scripted tool, especially in the setting of the medical hierarchy, is to strip and dilute the design profession of it’s most valuable tools rooted in logic, intuition, tradition, practice and specialization.

Highly effective educational models do exist. These include the Sabin+Jones LabStudio at The University of Pennsylvania, which was established in 2006 by architect Jenny Sabin and Peter Lloyd Jones. Our experience in LabStudio clearly demonstrates that seemingly unrelated, open-ended, data-, systems- and technology-driven programs are not mere alternatives to the more traditional design studio or hypothesis-led research, but can represent complementary, iterative, and reciprocal approaches that benefit all participants. LabStudio and its current offspring, Sabin Design Lab at Cornell Architecture and MedStudio@JEFF at Thomas Jefferson University in Philadelphia are now viewed as new paradigms for

thinking and doing in medicine and design pedagogy, and have since inspired other schools of design and colleges of medicine. The face-to-face discussion accompanying this report will dive into the rationale and benefits of these ongoing design and scientific research models within and beyond the design school.

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