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Head of Master of Design: Art & Technology *NACAA*

Joint Institute: l'École de design Nantes Atlantique & China Academy of Art

Co-Founder and Co-chair

Food Think Tank Working Group, Cumulus Association

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Dr Daou has 23 years of international experience in design pedagogy/research, leading philanthropic associations and higher education programs across sectors and continents in Australia, Asia, Europe and in the Middle East. Her expertise encompasses developing and delivering design strategy workshops and community projects for higher education and for organizations to achieve ecological and commercial impact.

Working between Melbourne and China, Dr Daou is currently the Head of: Master of Design, Art and Technology at NACAA: The 1st Sino-French School of design in China. Dr Daou aligns Australian, Chinese, and French ecological and entrepreneurial missions and visions.

Dr Daou established and led the Interior Architecture Program at Swinburne University of Technology, Melbourne and supervised its transition. Her career path led her to France, where she expanded

her research and expertise leading the Food Design Lab at l'École de design Nantes Atlantique with a sustainable systemic mission. Combining her Doctorate knowledge in interior architecture and urbanism with sustainable management of resources, Dr Daou focuses on a system-based strategies working across education, industry, and government to influence policies by initiating impactful projects with ecological with economic benefits.

Editorial:

Entrepreneurship mindset in design

My previous contribution to Journal of Design for All (ISSN:2582-8304), as a guest Editor was for the April Edition in 2020, Volume 15 No-4. At the time, the world was transitioning under the threat of COVID19 Pandemic, which surprised planet Earth and transformed our lives as we know it. The Planet is still facing uncertainties, however, we survived, and we thrived. Each country dealt with these uncertainties differently. In Europe, entrepreneurship spirit and mindset became especially valuable during this time to save the Planet and humanity by stimulating the economy through socio-economic and technological innovations led by business strategies and government policies. I have witnessed this entrepreneurship mindset fever firsthand when I volunteered for the EUvsVirus Hackathon, and Matchathon initiated by the European Innovation Council (EIC) and later, co-initiated and co-organized the EUvsVirus Launchathon. I was, thereafter, employed as the EUvsVirus community manager for 128 start-up teams from different cultural and disciplinary backgrounds. The common language that united this diversity was the entrepreneurship mindset. In three days, the Hackathon combined 40 countries and 37 languages, where 2,160 solutions were innovated in: Business, finance, socio-politics, education, and health, leading with the mission 'save jobs, save lives.'

Similar to the European Union (EU) policies after the 2008 economic crisis in Europe, the EU was able to partly implement during the EUvsVirus its 2020 strategy of smart growth to reap the value of entrepreneurship culture. This value aimed to stimulate the economy in Europe during the COVID19 threat based on 'the healthy flow of innovation' (Duma 2014). According to the

researcher Florin Duma, "[a]s stated in the *European Charter for Small and Medium-Sized Enterprises* small enterprises are the backbone of the European economy and they must be considered a main driver for innovation, employment as well as social and local integration in Europe" (Duma, 2014, 67). The EUvsVirus initiative temporarily freed entrepreneurship from its economic, cultural, and disciplinary constraints to develop an innovation mindset driven by multi-cultural and multi-disciplinary socio-economic and political values. Entrepreneurship was no longer a choice but a survival necessity to stimulate the economy and save humanity where the fever of innovation for survival was contagious. The energy of entrepreneurship innovation and risk-taking witnessed during the EUvsVirus initiative, was similar to that of the design process – combining scientific data and research, with risk-taking to innovate socio-economic solutions for the greater good of the community.

Designing entrepreneurship

Drawing onto my international experience, a colleague brought to my attention the opportunity to approach the definition of entrepreneurship in this Editorial from a multi-cultural and tri-linguistic perspectives in: English, French and Arabic. Linguistically and culturally the term entrepreneurship has different meanings, associated with its socio-economic and political values relevant to a specific culture and/or discipline. The exploration of entrepreneurship mindset from a design and a multi-cultural perspective offers the opportunity to free entrepreneurship from its traditional cultural and disciplinary constraints. This is specifically crucial in these times of uncertainties where entrepreneurship mindset could be the driver and the platform for innovation, to encourage a healthy balance between ecological and economic impacts. The term mindset

refers to our perception and our belief system, which reflect our values in an environment. These values influence how we define ourselves based on our actions. Through the common values, of innovation, risk-taking, challenging existing ideas, critical thinking, and autonomy both design and entrepreneurship mindsets are closely aligned and contribute to the growing economies. The main point of difference between entrepreneurship mindset and design in many cases is financial profit, which distinguishes the purpose of entrepreneurship from the design mindset.

Based on the exploration of entrepreneurship mindset in design I am opening the research scope to four authors from France, Australia, and China. Each author was invited to contribute to this Editorial based on their diverse cultural and disciplinary backgrounds, in academia and in design practice. The Editorial commences with the cover image, which was captured by the author at the Longjing Tea Plantations in Hangzhou, China. The image symbolizes the significance of cultural context and entrepreneurship impact, where ideas grow from seeds to fields, and they become the icons that represent the cultural landscapes and national identities. From a cultural context, at the first glance the landscape looks like a European village, once the reader is aware of the image's location and purpose, the perspective shifts and so does the relevance of the entrepreneurship idea and mindset.

Editorial overview

This Editorial offers an overview of the different factors that are currently influencing entrepreneurship mindset in France, Melbourne and China, such as: Technology, global policies, systems, cultures, economic, and education. Following the

Editorial Note is an article by Christian Guellerin titled *Education, GPT Chat and other diableries, or the upside-down daisi*. This article offers provocative thoughts on Chat GPT's implications on conditioning our mindset and raises ethical questions on the future relevance of design innovation and education. Followed by Dr Ingo Kumic's article titled *Design and Public Entrepreneurialism* explores entrepreneurship and design as catalysts for systems' change and their significance in city diplomacy and in reconciling social innovation and new economies that prioritize human and planetary health. Professor Blair Kuys' article: *Understanding entrepreneurial capability in Industrial Design education* explores the real-world impact and relevance that entrepreneurial capabilities in industrial design education play to reinforce 21st century competences, specifically in STEM, STEAM and STEAMED. The Editorial will close with a paper by Dr. Claire Chenxi Qi & et. al. titled: *East Sea Frontier: An intermedia Design for the Grand Town Changguo Wei in East China*, which demonstrates the integration of an intermedia design entrepreneurship project in historical heritage and cultural tourism in the Zhejiang province, East China. Each article offers a new perspective on entrepreneurship mindset in design and the difference that it is already making globally and locally.

The cultural evolution of entrepreneurship mindset

From a tri-lingual and a multi-cultural perspective, the term entrepreneurship has evolved historically. In his paper, Professor Derek Balfour Lidow from Princeton University mentions that there is evidence of entrepreneurial behavior that dates to the prehistoric human (2022). This inbuild mindset and behavior remains part of our natural traits to innovate for survival and to thrive, and it has evolved to adapt to the growth of the liberal economy, especially during the Industrial Revolution. The French

researcher in entrepreneurship, Professor Michel Marchesnay, mentions that in France industrial entrepreneurs started to appear at the beginning of the 1800's (2008). Marchesnay writes: "Entrepreneurship has long and somewhat routinely been identified as a key element of capitalism (see e.g. Wadhwani 2012), and this nigh-on ritual valorization of the concept has positioned it as a moral good in society (Bryant 2009; Clarke and Holt 2009, 2010)" (2018). This strong link between entrepreneurship 'moral good' and capitalism flourished during the Industrial Revolution. The new era, gave rise to the new generation of artisan looking at developing their profits through the machine technology and the new generation of agricultural businesses. This brought on a new form of capitalism for economic growth based on the valorization of entrepreneurship endeavors. Currently, in the age of the Digital Revolution, what is a relevant definition of entrepreneurship that defines our current era and in a local and a global context? Especially where there is the urgent need to find a balance between sustainability and financial profit. A relevant definition of entrepreneurship mindset is found by exploring its significance to the design process and outcome and its relevance to the growing economy based on multi-cultural contexts. This exploration offers a balance between socio-economic responsibility, ecological benefits, and financial gain to the planetary systems.

Tri-lingual mindset of Entrepreneurship

In French, the word, *entreprendre* means to undertake, 'to start doing or actioning' (Balfour, 2022). According to Lidow "The meaning of "entrepreneur" has been debated by western economists since it was coined by Richard Cantillon (1680–1734) in his pioneering description of economic forces, *Essai sur la Nature du Commerce en Général*, published in 1755. Cantillon

described an entrepreneur as "…someone who engages in exchange at their own risk for their own profit, distinct from landowners and commoners" (2022, 458). In the French context entrepreneurship definition carries a cultural, and a socio-political weight that constitutes a social hierarchy, to take the risk to become a business owner and step up in social, financial, and cultural status by running a profitable business for the 'moral good'. While in Arabic the translation of the word entrepreneurs is '*Roowaad*', which means pioneers. This description echoes the entrepreneurship values in being the first to introduce new frontiers of innovation into the market. In the English context, entrepreneurship is "[s]kills in starting new businesses, especially when this involves seeing new opportunities" (Dictionary, 2023). While the French and the Arabic definitions explore entrepreneurship from a socio-economic, combining new business ventures with personal achievement and social status, in addition to the political and community responsibility, the English definition regards the term from a profit and a business endeavor.

The value of entrepreneurship mindset in education was taken into consideration by the Finnish Ministry of Education who applied this mindset in primary school to encourage responsible citizenship (Maija et al., 2012). Based on entrepreneurship mindset teachers tested students on their responsibility to perform school and/or academic tasks, that require an individual to be actively responsible in: Managing their own affairs, risk-taking and have positive social skills. Education researchers Maija Korhonen, et al. Write: "[e]ntrepreneurship is seen either to increase competitiveness and innovativeness among citizens (thereby contributing to economic well-being and economic growth) and to help individuals to develop the personal capacities needed to cope with risks and uncertainty, or to have positive

effects on community development and social well-being" (2012, p. 3). Similar to the French context this entrepreneurship energy of innovation was witnessed during the EUvsVirus initiatives where the European Commission employed the entrepreneurship mindset to direct innovation to save the European culture and economy. According to Maija et al, entrepreneurship education is not only associated with economic goals but also, with community activism and to practice socio-economic democratic values in an open society (2012). In this sense entrepreneurship is more than just a service or a product it is about people's behavior and shaping humanity (Egan-Wyer et al, 2018).

The cultural values of the French definition to 'take action', combined with the Arabic meaning of pioneering and the English definition of developing a profitable business venture in addition to the integration of entrepreneurship mindset into early education systems liberates this term, culturally, socially and economically. According to Marchesnay in France entrepreneurship "[m]ore than adventitious disciplines, the human and social sciences, as well as political morals, are at the heart of understanding the entrepreneurial phenomenon" (2008, p.80). In this context, the definition of entrepreneurship mindset is explored through its process and purpose in identifying opportunities for new products and services that creates equal value for the community and for a sustained financial growth. This reinforces the three categories of entrepreneurship, which are: financial gain, the innovation of new ideas, and risk-taking.

Entrepreneurship in design

Entrepreneurship mindset in design is combining successful design idea with a successful business strategy for the 'moral good' of the community and for a sustained economic growth.

From the first idea the designer and the entrepreneur are building their process on a potential; they both take risks (*entreprendre*) and action to experiment and transform ideas that make a difference in people's lives. However, the main point of difference in the mindset between a designer and an entrepreneur is the validation of the idea by transforming it into a profitable business, based on market needs. Applying these differences, to encourage entrepreneurship mindset in design, will achieve a balance in the purpose of innovation, which is a balance between an innovative idea and economic viability and validity. This entrepreneurship mindset is the heart of the design education, especially the process of validating an idea, designers and entrepreneurs share similar criteria, which involves: Taking risks, challenging existing ideas, critical thinking, autonomy, breaking new grounds, and ceasing an opportunity to introduce a new service or product (Duma, 2008, 67). Combining the French socio-economic context into entrepreneurship mindset in design, creates community and socio-economic responsibility and relevance to develop a market need, and to pioneer and to 'take action' towards a viable business for the 'moral good'

The idea is the story: From seed to solution

Every entrepreneurship venture starts with a story and an idea that this product will make a difference in people's lives and or in own. We are seduced by the happy ending of the story, and we start the storytelling by: 'One day, they had an idea, then their business grew and now they are a business empire … and it all started with an idea'. We are seduced by the idea that a success story can happen to anyone. Both designers and entrepreneurs, start with an idea, the seed of innovation that commences the process and the purpose is the destination that shifts and changes along the way, based on is intensity. Growing this idea only on

financial merits, is only half of the story, the other half is the positive impact it will create in the world and in our lives. Entrepreneurship mindset is exactly this balance between 'moral good' and financial growth; it is using innovation to improve people's lives for the greater good while stimulating a healthy flow of community relevance and economic growth. This is exactly the essence of the values of design practice and pedagogy.

Acknowledgement

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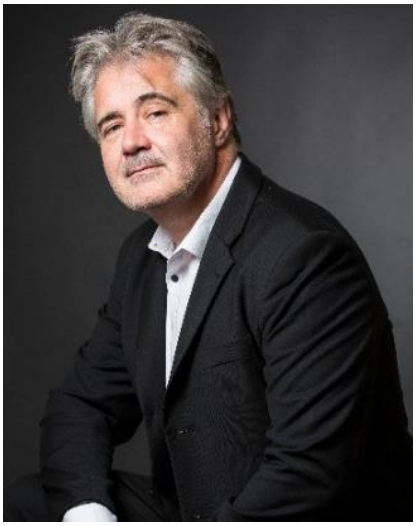


Christian Guellerin

Executive Director *L'École de design Nantes Atlantique*

Honorary President *Cumulus: International Association of Universities and Schools of design, Art: and Media*

Deputy Director and founder *NACAA: Joint Institute, L'École de design Nantes Atlantique, and China Academy of Art, Hangzhou*

Christian Guellerin is Honorary President of Cumulus. Under his leadership, since 2007 the Association grew from 80 to 176 members. This is the largest international network dedicated to design education with 3 100 000 students. Guellerin took a great interest in developing Cumulus into an important platform for sharing best practices in design education.

Guellerin is the CEO of L'École de design Nantes Atlantique, a higher education private institution for design. The School has established campuses in: Asia with locations in Shanghai, China, Bangalore, India, and continues to develop l'École de design Nantes Atlantique to become an international point of reference. Professionalising creative studies and establishing relationships with businesses is integral to his leadership strategies, practices, and education philosophy.

Guellerin is also the President of France Design Education, and French Design Schools Association. He has worked as an expert for the European Union to establish a design center in Turkey in 2003, and has been a consultant for various institutions between 2005 and 2011.

Education, GPT Chat, and other diableries, or the upside-down dais

The Fable of the Inverted Dais begins as follows:

"An evil that spreads terror

Evil that science in its fury

Invented to chastise learned mankind,

Artificial Intelligence, for we must give it a name

Diablerie, satanerie or instrument of the devil, waged war on learned and educated preceptor.

Not all of them died, but all were struck down,

Artists, designers, teachers, they were all going to die..."

Jean de la Fontaine

The challenge for design schools will be to reinvent the professions of creation and innovation at the same time as the professions of education. How to turn AI into an instrument of progress, desire and Love... Exciting and enthralling!

Six years ago, I was invited for a TedX in Bruxelles with the provocative title "What is being human when robots will be smarter than us?" It had aroused some offended and bellicose reactions, not very well argued, however, some being able to console themselves with the definition of intelligence, the content of which everyone can modulate for their own benefit. They could easily decide that we weren't talking about them. The performance of Artificial Intelligence is changing the game. 50% of students from a major French engineering school have just written their end-of-studies dissertation with the Chat GPT,

Artificial Intelligence software launched by the company OpenAI on November 30, 2022. This new version allows a real qualitative leap in the production of texts, perfectly elaborated, from simple or complex requests. It also generates its own reasoning beyond the simple repetition or paraphrase of existing texts. If a student in a class plagiarizes, it is easy to justify that they must be sanctioned, if 50% produce via Chat GPT, then it will be necessary to authorize or even encourage the tool for all otherwise to have to spend more time investigating the problem (the origin of a text) than to correct it. The absurd but inevitable consequence is that the production of the dissertation as a synthesis of knowledge useful to a project will have to be abandoned, and beyond that, it is all the personal work at home that will have to be handed over in question.

Chat GPT also offers simultaneous translation and dialogue interfaces allowing even the enrichment of the texts offered continuously. The more you use it, the more the machine continues to learn. The question for the designer – the one who represents the world of tomorrow – or the teacher – the one who transmits – is not to question the relevance of the tool and its damage to intelligence, but to pose aware of the question of how we are going to teach tomorrow and what will be the role of the teacher. It is the platform, that of the master, which is overturned with the ultimate question: What is my position from now on, to arouse what intelligence and what education?

Dall E deployed by the same company as Open AI offers analogous perspectives when it comes to producing images from a simple description. The images are contextualized according to the recommendations given to the software. "In the manner of Vermeer..." and potentially your portrait could hang in the Rijkmuseum in Amsterdam. However, and the question deserves

to be asked, should we continue to learn to draw? Clearly, Chat GPT and Dall E will write and compose better than us, draw better than us, and then better and better because users will constantly enrich them and teach them how to learn. Just like language teachers, history, drawing, graphic design teachers, etc. will therefore have to adapt to the new situation. It will be pointless to cry wolf, devilry, or any damnation, no one will escape this revolution in the exercise of knowledge management and production and/or in the exercise of creation. College students, high school students, students will overtake their masters unless they are deprived of their telephones and their computers. New York City public schools prohibits students and their teachers from using Chat GPT. The sanction is useless, it is widening the gap between real life and the education system which will be seen as obsolete. In higher education, it will have to be put on the program otherwise it will hamper the student's ability to be hired by the companies that will use it.

Should we continue to learn foreign languages? If it is only a question of communicating, of exchanging, of doing business, then learning is in vain. Each can be equipped with simultaneous translators who in the hollow of the ear will directly reproduce the words of your foreign interlocutor. Certain professions are directly threatened, teachers, translators, interpreters. But the linguist can rejoice in this as current, vernacular English, reduced to 5000 words to hold an autonomous conversation, invades the planet, all languages will be able to enrich themselves again without fear of misunderstanding. No longer learning foreign languages could be the condition for saving many which disappear by default of being used for the benefit of a usual "Globish". But what about teachers? The opportunity is offered to them to reflect on a different position, learning a foreign language being an

opportunity to enrich their own mother tongue, their own culture. In a globalized world, where difference will become revolutionary, language teachers could be the guarantors of culture and diversity. "I am learning English to better understand the richness of my mother tongue and all the nuances it offers to structure my thinking…"

Terrifying or exciting, Artificial Intelligence will impose itself on us. Not sure that tomorrow the teacher will continue to teach, to transmit knowledge. Wikipedia is just a click away, Chat GPT composes and renders the state of the art, synthesizes all knowledge at any given time, and Dall E offers everyone the ability to draw. There will come a lot of other softwares that will have performance far beyond any human capacity, the better, they will produce other knowledge. Some mourners talk about the accuracy, objectivity, and honesty of the billions of information that we will have immediately. You have to have heard two scholarly historians recounting the same proven fact to know that the truth does not exist, and that history is essentially revisionist. Why should the machine be less reliable than the two historians?

From "distance" to avatar

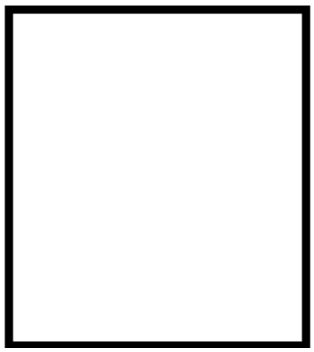
The Covid crisis and confinement have forced all educational establishments to set up distance learning courses, showing that it is possible to work without physically moving. Organizations are organized around remote work carried by a breath of ecological virtue of travel economy, which remains to be proven when we know the carbon footprint of a computer. There are many risks in dismantling the company through the organization of remote work, the quality of work, its social identification, the strengthening of control at the expense of trust, the use of service companies rather than salary because why hire someone on a

permanent contract if you never see them. However, to return to education, and this is what most scientific studies reveal, a distance course is more difficult to memorize than a face-to-face course. The absence of spatial context makes learning more random, as if we were learning something on the condition of somewhere. "I know where I was when France won the World Cup", the memorization of the objective fact is easier by identifying the place of learning. So, long live the face-to-face!?... Certainly. Then comes another "devilry": It is likely that very quickly the distance course will be replaced by the course by interposed avatar, avatar which will evolve in a virtual space which compensates for the lack of spatial identification. Here again, what place for the teacher in this virtual space? It is necessary to reinvent all the educational models, to renature the relationship of the Master to the student.

Conclusion

What is happening in design and creation schools, bears witness to this and foreshadows this revolution. The students accompanied by their design teacher share, test, experience, reformulate. It is the students who teach because they are the ones who are asked to have creative and innovative ideas. The role of the teacher is to arouse desire, creativity, never to constrain it, to be the enlightened actor of something that is beyond them. Its role is to encourage, to allow the emergence of new ideas, to accept the transgression, which in essence goes beyond intention, for knowledge and more knowledge. It is a question of encouraging, of correcting during moments of doubt inherent in all journeys into the unknown, of reassuring in the event of an error and thus justifying starting over. It will also be in the function of the teacher to study and choose the best

software and/or online courses rather than dispensing them. Chat GPT will have no trouble producing knowledge. A click and a question will make it possible to dispense with the teacher. But Artificial Intelligence will not be able to teach desire, that of the student, the one whose light is expected. At the time of major deadlines when resources are running out and global warming threatens humanity, where Chat GPT, intelligent avatars and other devils could take power, what else can we expect from our students and our teachers than they knock down the platform and together they build a better and smarter world.



Dr . Ingo KUMIC

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Ingo is a 'strategic/ systems design' practitioner and partnership broker and has qualifications in applied science, design and the humanities including a PhD, which examined the spatial political economy of competitive cities.

Ingo works at the intersection of public entrepreneurialism, city diplomacy and social innovation. He has a deep interest in helping cities develop multi-sector partnership responses to critical socio-economic and planetary challenges. Ingo has worked with a broad range of public, private, and community / civil sector stakeholders across Europe, the Middle East, and APAC.

Ingo currently leads the University of Melbourne's involvement on the Melbourne Partnership, a mission-based transformation alliance between the University of Melbourne, City of Melbourne and RMIT.

Ingo is also a Director of the Partnership Brokers Association (London) which represents partnership practitioners and standards in professional practice across areas such as: International aid and development, sustainable finance and responsible investment, city regeneration, philanthropy, and community development.

Localising Change: Public Entrepreneurialism and Design

"Nothing is as powerful as an idea whose time has come" **Victor Hugo**

The following seeks to prosecute the critical value of public entrepreneurialism in age where the relationship between human and planetary systems requires urgent transformation. Specifically, this paper will locate itself in the recurring and perhaps desperate idea that capitalism can be reset in a way that enables the localisation of sustainable development through (among other things) the structure and function of local economies. Therefore, by extension, it also shines a spotlight on the way in which this can be achieved, specifically, the application of strategic and systems design in support of public entrepreneurialism and the development of both the 'what' and the 'how' to enable critical systems' change.

To Hell in a Handbasket?

It is entirely reasonable to assert that at no stage in human history have our social systems – political, economic, and cultural – been in such a tense and precarious standoff with our planetary systems. The culprit, a political economic condition that has for the best part of 200 years been grounded in extractive behaviours where gains have been privatised and concentrated in the hands of the few while the losses have been largely socialised and distributed across the many. Of particular note is a dependence on fossil fuels which is still being subsidised to the tune of $USD11 million a minute (Millman, 2021). The UNFCCC refers to the consequences of this behaviour as the triple planetary threat of climate change, air pollution and biodiversity loss which according to recent figures – derived from the Living Planet Index – has resulted in up to 69% of wildlife populations declining

between 1970-2018 (Greenfield, 2022) and the emergence of 36 global hotspots (Greenfield, 2022). These areas include the Sundaland (Southeast Asia), the Caucasus, Wallacea (Indo-Pacific) and the forests of eastern Australia, as being rich in life but under human threat and requiring urgent protection. The Centre for Biological Diversity (2022) estimates that climate change could result in up to two hundred million people being displaced by 2050 with a 2-celsius degree increase resulting in a third of the world's food production being put at risk (Millman, 2021).

According to the UNFCCC, a 2021 report from one of the world's largest providers of insurance Swiss Re, revealed that climate change could cut the value of the world economy by $23 trillion by 2050. Developed nations such as the US, Canada and France may lose between six and ten per cent of their potential economic output. For developing nations, the effects of climate change are even more dire, with Malaysia and Thailand, seeing their economic growth 20 per cent below what would otherwise be expected by 2050. While the evidence of anthropogenic change is often glaringly material and measurable, it is perhaps the impact that these changes are having on our children, is of greatest concern. In 2021, researchers surveyed (Hickman,2021) 10 000 children and young people (aged 16–25 years) in ten countries (Australia, Brazil, Finland, France, India, Nigeria, Philippines, Portugal, the UK, and the USA) about their thoughts and feelings on climate change, and government responses to it. The primary conclusion of this study was that climate anxiety and distress correlated with perceived inadequate government response and associated feelings of betrayal. More than 75% thinking that their future is frightening and 83% saying that they think people have failed to take care of the planet.

But how do we begin to reset our relationship with the planet?

It is increasingly clear that today's planetary challenges cannot be solved by centralised command-and-control systems, nor by top-down policy settings and financial instruments. The answer to our existential dilemma lies in the dismantling of indifferent hegemonic socio-political systems, which at various times have been globalised and, as the Pandemic demonstrated, made vulnerable due to their highly diffuse nature. The recent Covid 19 Pandemic exposed our reliance on globalised production strategies and supply chains rendering many economies helpless. As is often the case those who already experience the greatest economic and political displacement and inequality were affected the worst. The compounding effect of climate change and the Pandemic forced many governments and private interests to re-think the nature of distributed supply chains and the impact that they have in 'place'. Manufacturers worldwide for example are under greater political and competitive pressures to increase their domestic production, grow employment in their home countries, and rethink their use of lean manufacturing strategies that involve minimizing the amount of inventory held in their global supply chains (Shih. Willy, 2020).

The drive to re-constitute 'local' economic capacity and in turn disrupt centralised systems of production and distribution is being felt across essential services such as food and energy. This is symptomatic of an increasing trend and focus on the social innovation required to localise new socio-political systems, which in turn create vertically integrated place-based political-economic structures. These emerging structures seek to negate the learned helplessness of market-based neoliberal socio-economic systems by ensuring that 'places' are not

only capable of connecting to global flows but determine the extent to which they are impacted by them. In some respect, this borrows from aspects of the past in which local political and economic systems reflected the nuances of place-based conditions and drivers of change, 'by the community, for the community'. The social innovation required to develop a 21st century version of this devolved state requires that we recalibrate our public-interest systems replacing authority with agency, ideas of growth with progress, ownership with stewardship, scarcity with abundance, and policies that ghettoise with ones that localise. Achieving this, crucially, also relies heavily on a new type of public entrepreneurialism emerging, one which leads what Indy Johar refers to as a deep code innovation (2022) rooted in creating 'the commons', and a type of community wealth that prioritises human and planetary health.

Place-based Systems Transformation-Deep Code (Social) Innovation

"This is not a voluntary transition moment. This is about whether you're viable in the next economy. This is not a moral crusade, it is an operational model in a new society where interdependence is more valuable and more critical" Indy Johar, 2022

According to the OECD (2022), social innovation refers to the design and implementation of new solutions that imply conceptual, process, product, or organisational change, which ultimately aim to improve the welfare and wellbeing of individuals and communities. Of particular interest in the localisation of change, or if you like, place-based transformation, is the deep code innovation of two immutable cornerstones of our society, finance, and governance. In an era of financial globalization, the emergence of massive pools of capital controlled by a limited number of markets means many billions of

people will be left behind unless finance is re-imagined. In The Flow, Gordon Noble argues that there are a range of critical opportunities to build sustainable financial markets which can deliver for all 7.8 billion people (2022). Noble suggests that financial systems need to focus on the creation of local markets that deliver development outcomes at real scale. The companion piece to this is ensuring that opportunities for transformation are also framed as investment opportunities. This often takes the shape of investment in assets and / or enterprise. Noble notes that the foundations of finance at its heart are actually very simple. Two products: Debt, and equity. Financial markets are the mechanism through which debt and equity are transacted.

While some regions in the world such as North America have a history of making debt available for investment in community through municipal bonds, for most the volume of capital required to transform place-based systems has largely been hindered by: A lack of scale (attractive enough for 'big capital' to mobilise), and the lack of public entrepreneurialism required to attract and catalyse capital. For example, models such as community wealth building – which up until recently were confined to one-off local economic development projects – are starting to gain traction as the basis to local systems transformation. Not surprisingly, new momentum around this broad-based way of thinking is largely down to the seismic shifts occurring within the global financial system itself. As noted previously, climate change related impacts, if unmitigated, are likely to result in catastrophic financial market failures. The fickle nature of risk and those mechanisms charged with evaluating risk are threatening to remove the safety nets which currently allow capital to be activated in the name of growth and wealth accumulation.

On the other hand, place-based capital, which sits at the heart of 'community wealth building' models, are aligned to emerging

sustainable finance requirements of the financial system. Out of necessity rather than some profound shift in core values, the financial system has re-written the risk criteria which determines the allocation of capital so that it is more accountable to and for human and planetary impacts. However, this shift is only part of the deep code innovation required. The companion piece to this, is the innovation required of local institutions and organisational forms, which is essential to secure, harness, and catalyse place-based capital. In large part this requires us to look at traditional local government structures and processes including the traditional role of local government in the process of deep code innovation. For example in Australia, there is a tacit recognition that our system of government is failing to deliver the style and quality of government needed in the modern world (LGPA, 2016). There is a tendency to reflect solely on the reform required of Commonwealth and State relations to fix the problem. Elsewhere in the world, far more attention is being focused on the problem-solving capability that approaches to local and regional governance, brings not least due to the space for social and economic problem-solving reflecting international trends towards decentralisation and subsidiarity (LGPA, 2016). The reason for this is that there is now widespread acceptance that building 'social cohesion' and enhancing economic productivity globally means tackling key challenges through community and place. However, innovation requires mature leadership and observable, manageable, and replicable processes with which to enable it.

This is where public entrepreneurialism comes in. Generally speaking, public entrepreneurialism is defined as the introduction and development of new ideas required to innovate the public sector. However, this paper seeks to go deeper and define public entrepreneurialism as the mode by which the public interest is

advanced through the building of public agency and the public value ecosystem through (things like but not limited) to: The creation of new 4th sector organisational forms, democratisation of community wealth (in the broadest sense) building, stewardship of public asset-based, selected mutualisation of essential systems (shelter, energy, food, water), and prioritisation of working with Country.

Enabling Public Entrepreneurialism, Design, and the Politics of Change.

"There is always a design phase; the issue is whether it is done consciously or not. An unconscious design phase is likely to be full of assumptions, missed opportunities and limited engagement. It will tend to reinforce business-as-usual rather than transformation, and negative outcomes rather than positive co-benefits. We must instead define and engage an active and participative design process for missions" Professor Dan Hill, University of Melbourne.

In recent decades, design has moved from a practice aimed at designing things, to one that plays a part in addressing today's complex societal challenges (Mieke Van Der, et. al., 2020). Bijl-Brouwer and Malcolm note that the social innovation context has an expanded focus compared to traditional product design: From users and customers to society more broadly; from designing products and services to designing complex service systems, organizations, policies, and strategies; and from the private sector to include the private, public, and social sectors together (2020). Compounding this complexity, design processes which drive social innovation also need to be participative. For social innovation to succeed generally, and place-based deep code innovation to succeed specifically, it is crucial that all stakeholders have the capacity to engage with the processes

through which we initiate change, in particular complex systems change.

There are two primary reasons for this: Firstly, and perhaps most significantly, change is political. For place-based change to be sustainable and meaningful, it cannot simply happen to a community or stakeholder group; it must be of the community, of stakeholders, of place. This is not some notion struggling for legitimacy in the soft vagaries of engagement and consultation events. Instead, fit-for-purpose design approaches such as strategic and systemic design are characterized by collaboration grounded in what Michael Schrage refers to as recombinant innovation (Morrison 2022), they are not simply about cooperation nor vague ideas about teamwork, they are innovation processes through which you develop high performance relationships, ownership of direction, shared investment risk and delivery costs, integrated leadership, and state-craft competencies. Secondly, the tacit transfer of design knowledge and capability over time will eventually become culturally embedded. The very nature of (strategic and systemic) design knowledge lends itself to the development of servant leadership, diplomacy, and agency rather than authorship, authority, and dependency. These are vital qualities of contemporary public entrepreneurialism and necessary if communities are to dismantle systems which have privatized gains, socialized losses, and created a learned helplessness.

Conclusion

The urgent need to innovate how we live has become a priority across the dominant political and economic systems of our age. Investment in single-solutions that directly address wicked problems grow exponentially year-after-year. However, as we gain better insights into the systemic nature of these wicked problems, it is increasingly

apparent that single solutions, which are project / product / service-based, transactional, and siloed simply uphold existing public, private and civil sector distinctions. These solutions fail to drive the systems innovation and transformation we need. Public entrepreneurialism sits at the heart of social innovation and in turn place-based systems transformation. Without it we run the risk of taking 21st century challenges, evaluating them with 20th century ideas and responding with 19th century tools (Albright, 2022).

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Entrepreneurship mindset for designers: Understanding entrepreneurial capability in Industrial Design education

Abstract

This discussion piece explores the nexus between entrepreneurship and Industrial Design education in the context of 21st century competences. The 21st century is marked by rapid technological advancements, shifting industry landscapes, and evolving societal needs, which necessitate a re-evaluation of educational priorities. This discussion delves into the critical competences identified for the 21st century, highlighting the importance of creativity, problem-solving, collaboration, innovation, digital literacy, and entrepreneurial skills. It examines the role of STEM (Science, Technology, Engineering, and Mathematics), STEAM (Science, Technology, Engineering, Arts, and Mathematics), and HASS (Health, Arts, and Social Science) education in preparing individuals for the future workforce. Additionally, it emphasises the significance of entrepreneurship in Industrial Design education, showcasing the potential of this discipline to foster entrepreneurial capabilities among students. The discussion concludes by offering recommendations for enhancing entrepreneurial learning within industrial design education and underscores the pivotal role of this field in shaping well-rounded and competent individuals for the 21st century.

Introduction

It is evident from the literature that Industrial Design education

plays a pivotal role in imparting a significant portion of these 21st-century competences. This underscores the substantial value and contemporary relevance of Industrial Design education in Australia, regardless of whether students ultimately pursue careers in the field. More specifically, Industrial Design education is poised to effectively cultivate key 21st-century competences such as creativity, problem-solving prowess, critical thinking, adaptability, innovation capacity, and communication skills, aligning them with the demands of the modern age. Furthermore, it is likely that STEM competences encompassing Science, Technology, Engineering, and Mathematics are adequately addressed within the curriculum, emphasising the need for a comprehensive and broad-based approach. The integration of Arts (the "A" in STEAM) may enhance the pertinence of STEM education, fostering a more holistic understanding of these disciplines.

Industrial Design education could also benefit from a more explicit focus on nurturing collaboration skills, promoting entrepreneurial aptitude, and expanding the incorporation of emerging technologies such as IoT (Internet of Things), VR (Virtual Reality), AR (Augmented Reality), and software development. Evidence suggests that Industrial Design education excels in delivering these competences in a practical and contextually relevant manner, further underlining its significance. Additionally, there is a growing importance attached to environmental sustainability knowledge and the ability to design for social change within the realm of Industrial Design education. However, it is noteworthy that cultural literacy, particularly in areas like design history and design theory, appears to be on the decline. In this context, libraries are emerging as informal

educational settings capable of providing agile support for the formal education process in Industrial Design. The literature underscores the pivotal role of Industrial Design education in shaping individuals with the competences required to thrive in the 21st century. This encompasses not only professionals in the field but also individuals equipped with the ability to adapt, innovate, and collaborate effectively in an ever-evolving world. It is imperative to recognise the enduring value of Industrial Design education as a cornerstone for the development of these crucial competences.

STEM, STEAM, and HASS

Many authors highlight the importance of STEM skills and knowledge for upcoming decades (Education Council, 2015; UK Government, 2018; Australian Government, 2018; Hong Kong Government, 2016). Some authors insist that STEAM (Science, Technology, Engineering, Art and Mathematics) skills and knowledge are even more relevant (Taylor, 2016, p. 91-92; RISD, 2018; US House of Representatives, 2013), while others assert the importance of balancing STEM skills and knowledge with HASS (Health, Arts and Social Science) skills and knowledge (ISA, 2017).

STEM skills are valued because workers and community members will need them in order to comprehend accelerating technological development because they are believed to boost Gross Domestic Product (GDP) through the generation of innovative technologies, and because STEM-related job opportunities are currently rising at a faster rate than most other job types and this is projected to continue (ISA, 2017, p. 2; Education Council, 2015). Some areas of STEM, however, such as computer programming and human-

machine interactions are likely to become more intuitive, more user friendly, and less technical over the next decades so may soon become more accessible to those with less technical interests (Hajkowicz et al., 2016).

Durrant-Whyte (2015) claims that the STEM skillset is too abstract to be broadly beneficial to society unless it is taught in an applied, contextual, meaningful manner (p. 29). He states that STEM should be taught through "architecting, designing and analysing" rather than as a purely hard skillset. Nesta, the UK's global innovation foundation, the United States' House of Representatives, the Rhode Island School of Design, and Taylor all assert that STEM knowledge can only be rendered meaningful and contextual with the addition of A for Art, making it STEAM (Taylor, 2016, p. 91-92; RISD, 2018; US House of Representatives, 2013). In 2013, the United States House of Representatives resolved to add Art and Design into STEM programs. The following are extracts from the resolution:

> ***"Expressing the sense that adding art and design into Federal programs that target the Science, Technology, Engineering and Mathematics (STEM) fields encourages innovation and economic growth in the United States"***
>
> ***"Whereas artists and designers are playing an integral role in the development of modern technology"***

Beitz (2015) suggests that STEAMED may be an even more appropriate skillset to aspire to, with D standing for Design and E standing for Entrepreneurship (Beitz, 2015, p. 163). This emanates from research and policy, nominating innovation and

entrepreneurship as important competences for the coming decades (Kuratko, 2009; Zhao, 2012; Hajkowicz et al., 2016, p. 9). Finally, Innovation and Science Australia, in its report Australia 2030 Prosperity through Innovation (2017), goes one step further to say that Australian education must nurture the combination of STEM with both HASS and interpersonal skills. This is further affirmation of the idea of the well-rounded citizen.

Entrepreneurship

Australian Government policy is supportive of entrepreneurship, especially when business endeavours centre around innovation (ISA, 2017). The 2015 National Innovation and Science Agenda Report suggests that Australia needs to create a culture accepting of risk taking and mistake making are vital ingredients of entrepreneurship (NISA, 2015). The Department of Industry Innovation and Science goes so far as to suggest insolvency laws be adjusted to assist risk-taking entrepreneurs (Australian Government, 2018). Phillips (2015) points out that entrepreneurs need to be multi-disciplinarians as industrial designers have been shown to be (WDO, 2018; NASAD, 2020, p. 125-126), and the Industrial Design competences authors associate entrepreneurship with Industrial Design very strongly (WDO, 2018; Lewis & Bonollo, 2002; NASAD, 2020; Yang et al., 2005; Erkarslan et al., 2011; Goatman & Moody, 2014; Gunes, 2012), implying that Industrial Design education is well suited to imparting desired entrepreneurial learning. The Australian Government believes that supporting collaboration between educational institutions and industry is a powerful way to drive innovation and develop impactful real-world solutions (ISA, 2017). Collaboration with industry is something Industrial Design education is well suited to because Industrial Design is a

profession originally created to serve and partner with industry (Zukowsky, 2017; UK Design Council, 2021).

Entrepreneurial learning

Several theorists espouse the high importance of entrepreneurial learning in schools (Zhao, 2012; Mitchell institute, 2017). Industrial designers of coming decades will need to work towards environmental preservation and will need to be knowledgeable about green technologies, new green materials and principles such as regenerative design or dematerialised design. Good policy and good education will be needed to support this.

Industrial designers may need to be resourceful post-pandemic and in the face of other potential geopolitical disturbances because of the low resilience of design professions to adverse conditions. However, they may find that more manufacturers move back to Australia post-Pandemic and this may improve their work prospects. Industrial designers may also need to reskill often as their jobs metamorphose or they may need to move their skillsets across to related or even unrelated disciplines. Industrial Design graduates of coming decades may apply their design skills to designing social and structural systems to counterbalance extreme technological change, or in a post-work scenario, they may focus on designing cultural and recreational artefacts, or designing and making for themselves.

In work done by Deighton (2022), she evaluated the top competences deemed of high priority for the 21st century comparing with the top Industrial Design competences as identified in the literature. This is summarised in the two tables below:

Top 21st century competences	Top Industrial Design competences
Creativity	STEM
Problem solving	Entrepreneurial capability
Collaboration	Problem solving
Innovation	Creativity
Digital skills / connectivity	Interpersonal skills
Entrepreneurial capability	Empathy
Critical thinking	Communication skills
Adaptability / flexibility	Digital skills / connectivity
Communication skills	Literacy
STEM or STEAM	Critical thinking
Interpersonal skills	Environmental sustainability knowledge
Cultural literacy	Innovation capability
Environmental sustainability knowledge	Collaboration
Global outlook	Ethical understanding
Leadership	Cultural literacy
Literacy	Organisational skills / project management
Learning to learn	Learning to learn
-	Research skills

Fig 1. The top competences deemed of high priority for the 21st century comparing with the top Industrial Design competences as identified in the literature.

Although there are biases inherent in these lists of top competences generated from the literature, information gathered here provides a reference point and highlighted the so-called 'soft

skills' required for the future workforce. Importantly for Industrial Design, we see significant emphasis on entrepreneurial capability showing the important of this competence in developing an entrepreneurial mindset for designers.

Considering the high regard placed on entrepreneurial learning by authors focusing on 21st century competences, and recognising the unique position of Industrial Design education among disciplines — one that is not strictly a business-oriented discipline yet closely aligned with the needs of manufacturing and distribution industries — it becomes evident that Industrial Design education, across various levels, is exceptionally well-suited for imparting essential entrepreneurial knowledge to students. Entrepreneurial capability represents a pivotal attribute within the realm of Industrial Design, and the inclusion of entrepreneurial learning emerges as a natural and pertinent component of Industrial Design education, making it an ideal curriculum for fostering valuable entrepreneurial competences. In the context of these significant 21st century competences, several noteworthy aspects come to light. Firstly, there is a growing awareness of the escalating importance of imparting environmental sustainability knowledge to students pursuing Industrial Design education. Secondly, there is a proposition that greater emphasis should be placed on integrating entrepreneurial learning into the curriculum of Industrial Design education. Thirdly, there exists a need for a broad and comprehensive approach to STEM education within the realm of Industrial Design. Fourthly, Industrial Design education demonstrates the potential to equip students with crucial personal qualities, adaptability, flexibility skills, and essential life skills. Lastly, there is a discernible trend indicating a decline in cultural literacy learning within the domain of Industrial Design education.

Each of these elements contributes significantly to advancing our understanding of Industrial Design education in Australia.

It is worth noting that while some sources suggest that entrepreneurial learning need not be frequent, the inherent nature of Industrial Design learning positions is ideally for delivering relevant and contextually grounded entrepreneurial education. This approach is undeniably beneficial for students, therefore, should be actively pursued. At the university level, the entrepreneurial learning gap appears to revolve around the ability to transform design ideas into profitable ventures, which necessitates universities to cultivate strong relationships with collaborators and develop projects where students can bring simple concepts to market.

Turning our attention to the relevance of Industrial Design education itself, it is foreseeable that there will be heightened demand for industrial designers in Australia, driven by potential increases in manufacturing activities post-pandemic and expanding opportunities for individuals to engage in entrepreneurial design and manufacturing. However, Industrial Design education goes beyond preparing future industrial designers; it equips individuals, including entrepreneurs, manufacturers, and consumers, with insights into the products they will conceive, fabricate, distribute, use, and eventually dispose of. Consequently, Industrial Design education deserves acknowledgment from policymakers and educational leaders for its role in delivering essential 21st century competences and educating students about the products that shape their surroundings, irrespective of their future career paths.

Industrial Design education should be recognised as one of the

most effective platforms for instilling crucial entrepreneurial capabilities in students across various educational levels. This approach aligns perfectly with the educational framework as it provides a structured pathway for identifying and addressing real-world problems, opportunities, and needs, ultimately yielding valuable outcomes. Potential models at different educational levels include introducing concepts of entrepreneurship and mock financial transactions in primary schools, connecting secondary school students with community groups for real-world projects that do not disrupt their assessment systems, and offering tertiary students insights into actual business models they may later engage with professionally. Furthermore, community and government grants should be made accessible to support the additional time and resources sometimes required for implementing such programs. Additionally, Industrial Design education can play a prominent role in the delivery of STEAM education. STEAM, known for its engaging approach to imparting valuable STEM skills and knowledge, can also serve as a more appealing avenue to involve females in lucrative STEM fields (RISD, 2018; Taylor, 2016, p.91-92). Moreover, STEAM-related occupations may prove to be less susceptible to automation, making Industrial Design education and STEAM education valuable contributors to contemporary student development.

Conclusion

Industrial design education is uniquely positioned to impart vital 21st century competences, especially entrepreneurial capabilities. As the world continues to evolve, Industrial Design education should be recognised as a crucial avenue for equipping students with the skills and knowledge necessary for success in a dynamic and interconnected 21st century landscape. By embracing

entrepreneurship and multidisciplinary collaboration, Industrial Design education can contribute significantly to the development of competent and adaptable individuals ready to tackle the challenges and opportunities of the modern world.

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East Sea Frontier: An Intermedia Design for the Guard Town Changguo Wei in East China

(Note:This paper is an extended version of the paper "Mapping the History: An Intermedia Design for A Coastal Town in East China", which was published in the conference proceeding of The Future of Heritage Science and Technologies ICT and Digital Heritage, Rocco Furferi, et al. eds, Springer, 2022.)

Abstract

Intermedia technologies are rapidly developing in preserving and presenting historical heritage. Intermedia technologies such as mapping, projection, motion capture, 3D modelling, information visualization, and interaction design expand the scenario of displaying hidden history. This article presents an intermedia design project of the East Sea Frontier as a potential entrepreneurship venture, commissioned by Xiangshan County for its cultural tourism in the coastal area of Zhejiang province, East China. Xiangshan County has a history of ancient coastal defense. Changguo Wei was a guard town in Xiangshan. The design aims to create a cultural identity of Changguo Wei with expressive intermedia narration and artistic language. First, we search historical documents and discover critical stories for representation. Secondly, we formulate the design concept and find the location to realize it. Then, we apply multiple technologies to visualize the historical content and build the interaction for an enhanced experience. The complete design consists of Light Matrix, Virtual Armor, Mapping Ancient Xiangshan County, and

Meta Space Tour of Changguo Wei. This project provides various ways to integrate entrepreneurship initiatives through design into cultural tourism.

Introduction

The coastal defense was an essential part of state defense in the Ming dynasty in China. The Southeast coastline of China has been under continuous attack by Japanese pirates since the 17th century. The royal court of the Ming Dynasty formed a defense system along the coastal line to protect the people and the land. The system consisted of guard towns (卫), battalions (所), and communication routes. Wei-Suo (卫所) was the system's basic unit. Zhejiang, Fujian, and Guangdong were the three main provinces that formed the military frontier against Japanese pirates in the southeast coastal area of China during that period. Each province had the same defense system operated with local geological features and cultural backgrounds. (1) Many official documents carefully recorded the defense system and the battles. Maps of prefectural cities, counties and guard towns were also included. In addition, there were paintings depicting Ming armies fighting with pirates considered as another kind of historical document.

Changguo Wei was a guard town in Xiangshan County in Zhejiang province during the Ming dynasty. The local government commissioned the project to promote its history as a cultural identity for tourism. With the aims of providing various ways to integrate historical heritage into cultural tourism with entrepreneurship strategies, our team forms the concept of the East Sea Frontier. It is an intermedia exhibition inspired by

historical documents consisting of four interactive installations. The Light Matrix installation demonstrates how the watchtowers transmitted the signals of upcoming battles during wartime. The Virtual Armor allows the tourists to virtually dress up in a suit of lamellar armor in Ming style. The Mapping Ancient Xiangshan County is a projection of a digitalized ancient map of the county in the Ming and Qing dynasty. Finally, the Meta Space Tour shows the local history, an interactive wheel map of Changguo Wei, and an interactive installation of a virtual navy battle. Each part allows tourists to experience an aspect of the coastal defense history of Changguo Wei. The design of the East Sea Frontier revives the historical scene of the invasion of the Ming army fighting against the Japanese invaders nearly six centuries ago.

This paper presents the academic research and the design methodologies in the project. The parts of the interaction design are realized in a laboratory circumstance. A short version of the paper was published as a conference paper in The Future of Heritage Science and Technologies ICT and Digital Heritage, Third International Conference, Florence Heri-Tech 2022.

Literature review

Academic research on the application of media technologies in cultural heritage preservation and representation focuses mainly on the technologies, design methodologies, technic implementations, and representation strategies. (2) Jeffrey T. Clark claimed that in cultural heritage, 'construction' should be a tool for understanding the subject rather than repeating the reality. (3) Practitioners like Jeffrey Shaw embraced the conjunction of technologies and cultural heritage. (4) Yet there are articles questioning the nature of the virtual reconstruction of

the cultural heritage. After sorting digital technics applied to cultural heritage, Liritzis and others pointed out there are adverse effects that cultural heritage is fragmental during the digital processes of 3D scanning, image digitization, information analysis, and virtual environmental reconstruction. 'Immersive feeling' overwhelms 'scientific knowledge.' (5) Forte wrote that incorrect digital reproduction of the subject would cause cognition loss rather than increase. He believed that cultural heritage, such as archaeological information, should be organized with correct context from cognitive aspects of the complexity of virtuality. (6)

Recent research shows a more positive attitude on this topic. The value of digital reproduction lies in interaction. (7) Transformation in such a design strategy implies that the viewer's experience becomes the centre of the design. Furthermore, cultural heritage is defined by their inextricable connection to society and people. Social development inevitably impacts the accumulation of knowledge of cultural heritage. (8) Cultural heritage evolves along with societal development. One phenomenon is that cultural heritage tourism has flourished significantly. Advanced technologies emerged and heated this market on a global scale as well. There is opportunity to initiate entrepreneurship venture that encourage the implementation of cultural heritage. Beyond theoretical analysis, the pursuit of economic growth excites many.

Case studies and methodology

Case studies

Two cases are analyzed to compare the methodologies and design concepts:

Namban Byōbu the Tenshō Boys Embassy

Many design projects transformed historical heritages into artworks. For example, the Namban Byōbu the Tenshō Boys Embassy (Nanban folding screen Tensho Mission to Europe), created by teamLab, was a video projection on the wall and designed to interact with a smartphone app. (9) The video depicted trade between the Japanese and Portuguese at the port of Nagasaki around the Azuchi-Momoyama period. People of various races, occupations, and historical figures walk around the scene. The scene changed along with the actual seasons. In 1582 four young boys traveled to Europe from Nagasaki to show the results of Christian missionary work in Japan to the Pope as "Tensho Missions to Europe." The work also combined this historical event with the trade scenario. The original folding screen's artistic quality and the Christian mission's storytelling were merged with the animation and the interactive experience. The work innovatively combined two stories into one context, interweaving time and space without losing the essence of the actual history.

Pure Land

Some works were more valuable for academic research or exhibition in a museum, such as the Pure Land project of Dunhuang Cave Paintings by Jeffrey Shaw. (10) It was a design of two visual systems showing the endangered Dunhuang cave paintings by augmented reality. The system integrated archeological data with an immersive visual display. Dunhuang was a gateway in northwest China more than a thousand years ago. It was a geographic cross-point on the Silk Road and a place for worshiping Buddhism. For a long time, monks and artisans

produced murals and sculptures of Buddha in the caves in Dunhuang. But the artworks were very vulnerable due to weather conditions and the heavy load of tourists. Pure Land is initiated to preserve this cultural treasure. The project recreated a virtual environment of the caves by embedding high-quality photographs of the mural paintings and laser scanning data into a 3D visualization system. Audience could see the stereoscopic images in a panoramic environment using head-mounted glasses or tablets. This design strategy comprehensively represented archeological information and provided the audience with an informative experience.

Methodology

This section briefly describes the software TouchDesigner applied in the project and the design strategy of the project.

TouchDesigner (TD) is an intermedia development platform developed by the Canadian company Derivative. It is widely used in real-time projects such as interactive media systems, 2D or 3D projections, music visuals, or rapid prototyping in artistic, educational, or commercial cases. TD's open platform offers multiple solutions to various projection scenarios. TD can communicate with LED lights. It converts many types of data to activate LED lights and allows flexible visual effects. It imports various visual or audio files, and exports enhanced intermedia displays. Connected with the Kinect toolkit or webcam, TD enables real-time geometry modelling or motion capture to control interactive installations.

The East Sea Frontier applies these functions to visualize the design concept. The first stage is a site survey and historical document research. We formulate the design concept for each

part based on the survey and research results. The second stage is to visualize the design concept utilizing visual elements from historical documents, physical materials, and simulation of the environment. Our design also implements intermedia design principles to prepare the visual part suitable for the interaction effect. The third stage is TD programming. Several tests improve the visual effect and upgrade the visual experience before drawing the result. (See Fig.1)

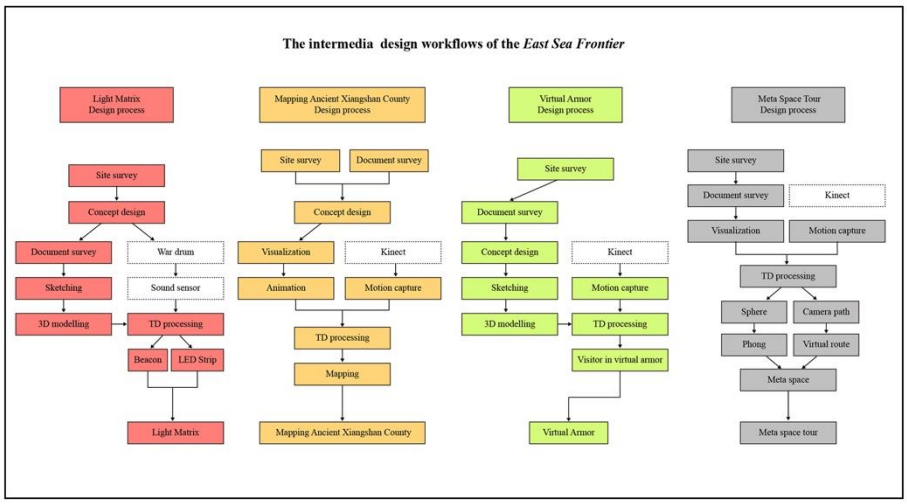


Fig.1. The intermedia design workflows of the East Sea Frontier

The history of Changguo Wei

Xiangshan County was established officially in 708 AD in the Tang dynasty, located on the east coast of Zhejiang province, east China. As one of the most important ports of Zhejiang, Xiangshan County was famous for trading and as a safeguard. Since the early Ming Dynasty, Japanese pirates invaded this area annually. Therefore, the Ming court built a coastal defense system to pacify the area. It was called "Five Guard towns and Nine Battalions" (五卫九所). Wei-Suo was an abbreviation of the system. It constructed guard towns and battalions and was supplemented by military facilities such as inspectors, beacons, and piers. Changguo Wei

was built as part of the system during this period. (11)

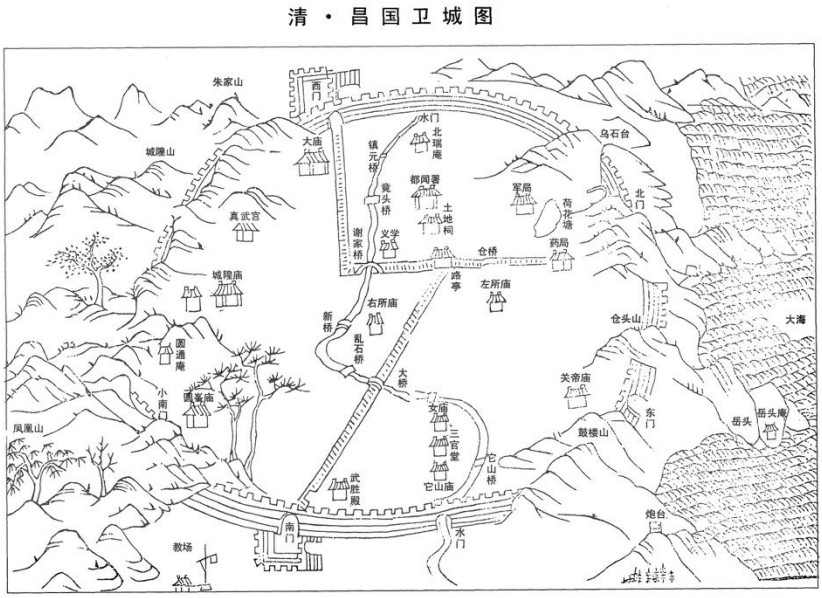
Overall, Changguo Wei consisted of one guard town and four independent battalions connected by courier route. The guard town covered an area of approximately 1.1 square kilometers with a maximum garrison of over 4800 troops. There were offices, arsenals, temples, and barracks inside, walls with watch towers, and training fields outside. (12) (Table.1). Initially, it functioned exclusively as a military fortress. Gradually the army became self-sufficient and increasingly involved in civic service due to the military farm system, like most of the garrisons did in the Ming regime. (13) The soldiers operated military farms around Wei-Suo part-time to provide their supplies. Once the pirates attacked, the farmers were recruited as soldiers.

Facility		Changguo Wei
Military Facilities	Command Centers	Dukun Office
	Other Military Facilities	Qidao Temple, Military office, Pharmacy, Lotus Pond, Training fields, Barracks
Civic Facilities		14 temples, 1 palace, 1 townhall

Table 1. The analysis of the urban plan of Changguo Wei in the Ming dynasty

There were several sorts of documents archiving this distinguished military history. Atlas of Coastal Defense (筹海图编), an authoritative coastal defense document, was edited by Zheng Ruozeng and Hu Zongxian in 1562. This document had two volumes: The first volume had text records of the military system of the southeast area of China. It also described geographical characteristics such as offshore areas, bays, tidal river-mouth,

mountains, ports, etc. The second volume included a study of Japan and detailed drawings of armour, weapons, and marine ships. (14) Local chronicles were another authentic resource of ancient maps. The map of Changguo Wei was shown in The Chronicle of Xiangshan County in the Daoguang period in the Qing dynasty. (See Fig.2)



注：依清道光志《昌国卫城图》绘制

Fig. 2. The Map of Changguo Wei Guard town

Artistic paintings also depicted the history of sea battles against pirates. One was illustrated scroll Wako-Zukan（倭寇图卷）by Qiu Ying, probably produced in the early 17th century. (See Fig.3) It was a visual document for celebrating a victory over the pirates. (15) It came to Japan from China in the early 20th and is now in the Historiography Institute, Tokyo University archive. In 2010, an infrared analysis of the scroll was conducted by Historiography Institute, and researchers discovered some characters beneath a painted flag on one of the ships. It indicates that the scroll depicted a battle that possibly happened in 1558. (16) It depicted the story in four stages. The first stage was Japanese pirates invading by ships. The second stage was pirates looting and

burning a village. The next stage was Ming soldiers fighting against pirates on boats. The final stage was the Ming army marching from a guard town to the battlefield. It provided significant information and a visual supplement for our design.

Fig.3 Wako-Zukan

The East Frontier

Even though it was the birthplace of its history, only a few cultural monuments remain in Changguo Wei, and no other forms of displaying it. Moreover, due to the province's rapid urban development during the last 40 years, Changguo Wei faces a disequilibrium between economic demand and cultural inheritance. (17) Developing a cultural tourism economy is a common entrepreneurship solution in such circumstances.

A local theme park, an ideal location for the project, was constructed in 2021. It is part of a more prominent tourist zone by sea, Half Mountain resort, famous for its natural scenery. However, most visitors find the park lacking cultural attractions. People are no longer easily attracted by traditional sightseeing and only come here in summer. After the theme park opened, operating income was consistently low. To revive the site, cultural heritage tourism becomes a solution. Local government founded a company to execute the initiatives. Changguo Wei's original location is only a few kilometers from the theme park. Therefore, The East Sea Frontier is designed to be located in this theme park. The theme park has two sections (A&B). The whole project covers an area of approximately 3,000 square meters in the section A. (See Fig.4)

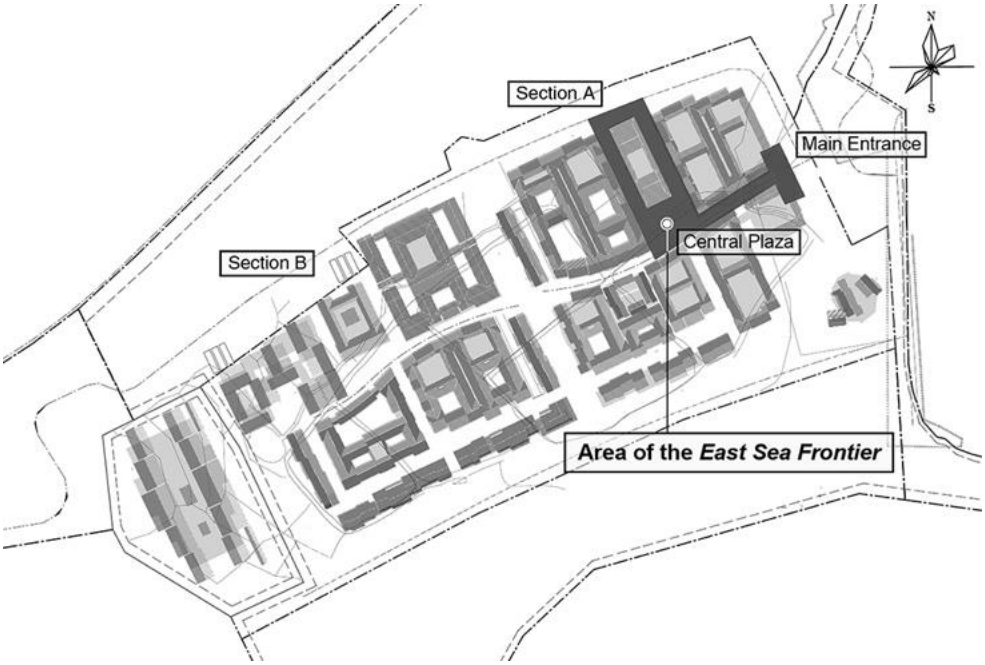


Fig.4. The master plan of the local theme park

The concept is to allow the tourists to enjoy an immersive exhibition with rich historical information and living narration. (See Fig.5) Four installations occupy different spaces in the park. First, the Light Matrix leads the visitors from the main entrance to a central plaza. Secondly, an enormous interactive animation of Mapping Ancient Xiangshan County is projected on a building's walls. Then, the Virtual Armor is installed on an opera stage, modeling armor in an antique style. Finally, an indoor intermedia exhibition of Changguo Wei, Meta Space Tour of Changguo Wei, is installed inside a building on the backside of the stage.

Fig.5. Simulation of the Mapping Ancient Xiangshan county

The Light Matrix

According to Sequel Research on Coastal Defense History in Zhejiang (两浙海防类考续编) and ancient maps documented in the Chronicle of Xiangshan County in Daoguang period in the Qing dynasty (清道光象山县志), there were beacon towers or watchtowers all along the coast of Xiangshan in the Ming and Qing dynasty. (18) (19) It was a communication system that could be put into operation rapidly. Soldiers lighted up fire or smoke to transmit signals when pirate ships were spotted. Five of these were constructed on hills in the Changguo Wei area. The main body of the beacon tower was usually built of bricks with a granite base; it was narrower on the top and broader at the bottom. (20)

The Light Matrix installation simulates the beacon towers both in form and function; it is designed to be installed between the entrance and the central plaza of the theme park. It has three parts, two war drums with sound sensors, two LED light strips installed along the path, and several beacon lights attached to the building walls. The LED strip is made of IP68-rated plastic and customized lightweight skeletonized aluminum. A 3000K temperature color light source produces a blaze effect. The configuration of the beacon light embodies the key features of the ancient beacon tower—a frustum cone-like hollow lamp with incandescent light. The shell is made of cast copper coloring in bronze. The name of each beacon light is projected on the wall through the hollowed-out sections symbolizing the original beacon tower.

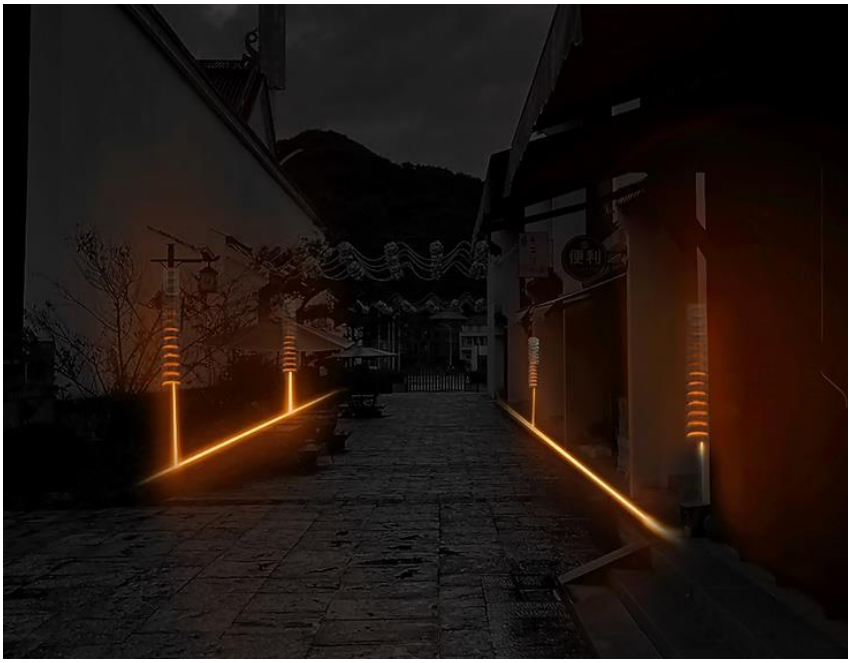


Fig. 6 Simulation of the light matrix installed in the theme park

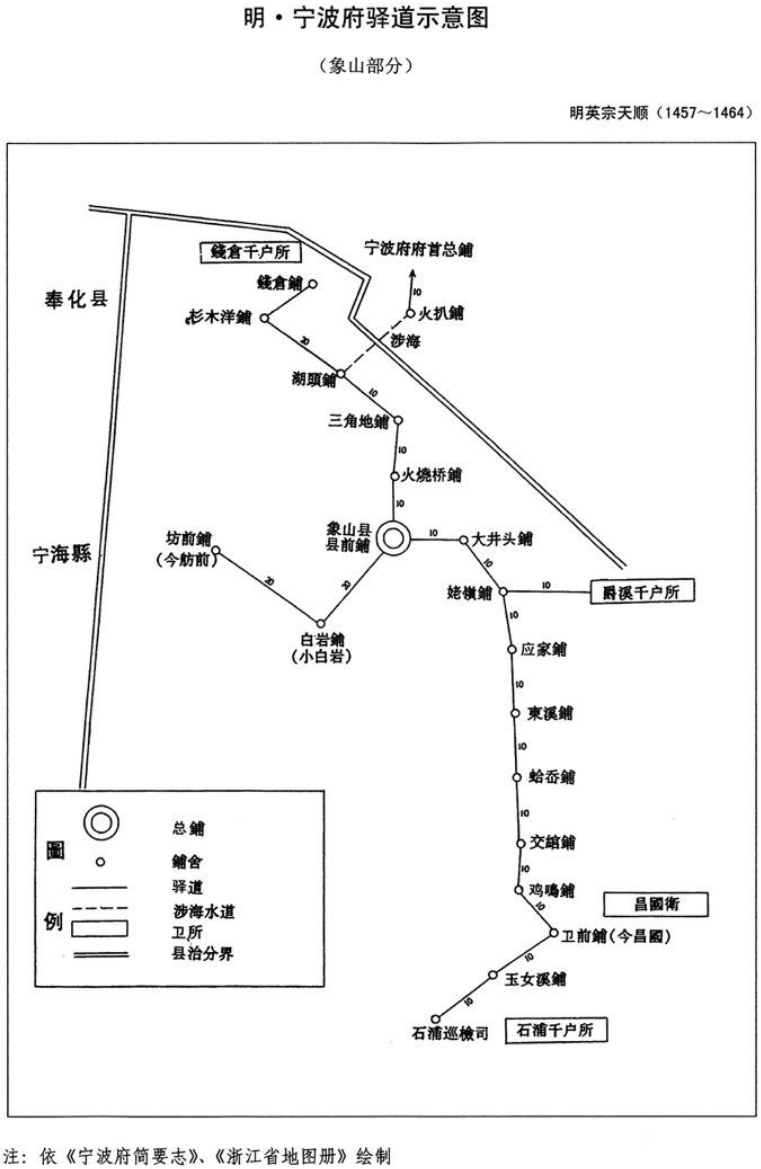
When visitors beat the war drums, the sound sensors capture the sound signals and trigger the light strips and the beacon by TD. The LED strips would create a flowing light imitating the signal transmission in ancient times when the flowing light reaches the beacon and turns it on. The faster the war drums are beaten, the brighter the 'blaze' becomes. Therefore, it corresponds to the signal-transmitting process and allows the visitors to immerse themselves in a battlefield atmosphere by imitating sending a war message. (See Fig.6)

Mapping Ancient Xiangshan County and Virtual Armor

The Light Matrix leads the visitors to the central plaza of the park. An interactive animation projection, the Mapping Ancient Xiangshan County, could be seen on the walls of a building on the plaza's south side, showing Xiangshan County and Changguo Wei in the Qing dynasty.

The design combines two historical maps. The first one is a colored map of Xiangshan County documented in The Atlas of Zhejiang (浙江全图), whose author remains anonymous. This precious manuscript is currently in the collection of Département des Manuscripts, Bibliothèque Nationale de France. (21) The complete set contains 88 maps of 11 counties in Zhejiang Province in the Qing Dynasty, including Xiangshan County. The map charts its geographical features and Changguo Wei's location on the coastline. (See Fig.7) The other one is a roadmap from A Brief Chronicle of Ningbo (宁波府简要志) and reprinted in the Military Chronicle of Xiangshan (象山军事志). (22) (See Fig.8) The map outlines the courier route from Xiangshan County to Changguo Wei, with each courier station inscribed.

Fig. 7. The digitized map of Xiangshan county in Mapping Ancient Xiangshan County



注：依《宁波府简要志》、《浙江省地图册》绘制

Fig. 8. The courier route map of Ningbo in the Ming dynasty

Additionally, the animation occupies specific ancient poems about Xiangshan to convey cultural richness. Eighteen poems written by local poets in the Ming and Qing dynasty are documented in the Chronicle of Changguo Wei (昌国卫志), describing the landscapes and coastal defense history. (23) We excerpt five poems and visualize the texts.

We implement the original map as the background layer and include additional visual elements, such as inhabitants, mountains, trees, poems, beacon towers, and the courier route. They are extracted, segmented into multiple layers, and added to the background layer. Our team also animates scenes such as fishers cleaning with nets, locals performing drama, smoke rising from the beacons, and soldiers training to shoot arrows. Images are reproduced in a similar style as Wako Zukan. Subsequently, the augmented map is projected on the walls. The dynamic effect of the projection visualizes manifold information about the history and provides an aesthetic experience. (See Fig. 9)

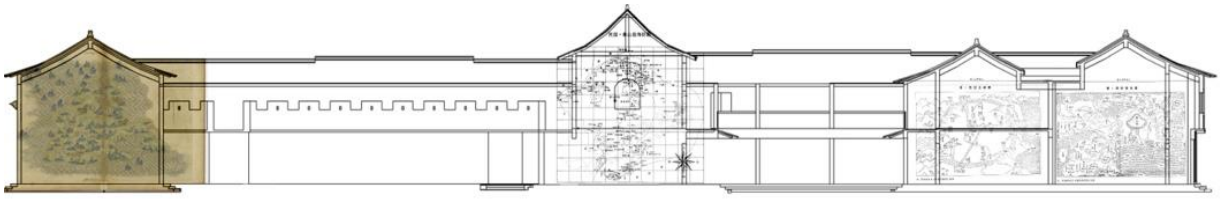


Fig. 9. Simulation of the projection on walls

After experiencing the digital map, the visitors could visit an opera stage across the plaza. The Virtual Armor is installed on the stage. It includes a display screen, a motion capture system, and TD as a backend processor. When a visitor's body movement is detected, the human figure is rendered by TD and appears wearing a lamellar armor suit on the screen.

In the Ming dynasty, lamellar armor for the navy was made of iron, calabash, or leather. (24) We render the virtual armor with an iron texture and apply a suit pattern for higher rank officers. Therefore, it dresses the visitor as a navy officer from six centuries ago. The virtual figures could interact with each other if several visitors were detected. (See Fig.10)

Fig.10. Simulation of Virtual Armor installation on the opera stage

Meta Space Tour of Changguo Wei and indoor exhibition

After experiencing the ancient map projection and the virtual armor, visitors could move to an essential exhibition section; it is an innovative interactive installation that conveys more comprehensive content and includes three sections:

- ***A chronological document exhibition***
- ***A compass wheel carved with the urban map of Changguo Wei***
- ***An immersive interaction installation of the Meta Space Tour of Changguo Wei (MST)***

The document exhibition consists of eight scrolls introducing Xiangshan County's history in the Yuan, Ming, Qing, modern, and contemporary periods. The compass wheel applies a concentric circle form and an extra translucent overlay of printed Qimen Dunjia (奇门遁甲). It is known as 'Strange Gates Escaping Techniques,' an arcade form of divination to form military tactics developed during the Warring States period in China. By rotating the compass, the urban map of Changguo Wei corresponds to Qimen Dunjia, indicating that it was devised for military tactics. (25) (See Fig.11)

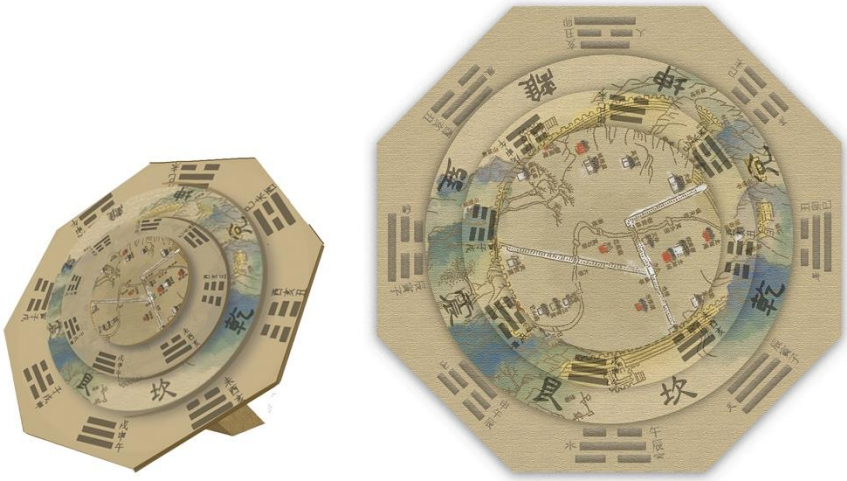


Fig. 11. Simulation of the compass wheel

The essential installation in this part is the MST. It is an intermedia representation of a battle against pirates. Physically it utilizes a large-scale LED screen and motion capture system. Walking toward the screen, visitors can see a virtual battlefield. The peninsula of Xiangshan County is morphed into a sphere—like a planet Xiangshan in a meta space. The sphere sits in the center of this space and rotates continuously. The map of Xiangshan county is applied on the sphere as Phong texture. The space, a metaphor for the battlefield, is scattered with numerous images--mountains, villages, natives, ships, pirates, and soldiers dashing forward to the viewers endlessly. It creates a tense battling effect. These images are extracted from the scroll Wako-Zukan. A virtual courier route is extracted from the route map and transformed as a linear path extending into the distancing space.

Likewise, MST uses motion capture technics to collect real-time data for the computing process. With the reflective marker technology, the viewer's body movement is followed by infrared light sources built into each camera. In a valid visual field of 3 to 5 square meters, the distance between viewers and the screen would be detected precisely at the millimeter level. The data of

the distance between the viewer and the LED screen maps the built-in camera motion trail and moving speed parameter. Therefore, the virtual route automatically stretches into deeper space when a viewer approaches and speeds up when the viewer moves closer. (See Fig.12)

Fig. 12. The visualization of the Meta Space Tour of Changguo Wei

Graphics in MST are superimposed on the specific frequency bands, so a variable speed effect on the y-axis can be achieved. MST includes approximately three hundred polygonal shapes and various texture data. After processing the data, TD broadcasts the data to the LED screen via the Virtual Reality Peripheral Network (VRPN) protocol via Ethernet. The LED screen is 6 meters long and 4 meters wide with a resolution of 3840 × 1088 pixels and a dot pitch of 3 millimeters. The screen has a black matte surface, corrugated light-absorbing masks, and an automatic brightness adjustment function. It enables the viewer to see clearly in bright environmental light.

Inspired by historical facts and conjunct with intermedia technologies, MST develops from a simple visual reconstruction to a multi-layered interactive narration. It interprets written documents into a symbolic scenario in virtuality. The design strategy is to break the timeline and geographic structure to create an imaginary space journey.

Conclusion

The East Sea Frontier project offers an immersive experience for visitors by combining historical heritage and intermedia technologies. Altogether, the Light Matrix, Virtual Armor, Mapping Ancient Xiangshan County, and Meta Space Tour of Changguo Wei express the richness of the history and intermedia aesthetics. The design concept creates a new narration with a nonlinear structure. Thanks to Touch Designer, motion capture technology, and multiple types of equipment, it is possible to develop an interactive system to visualize the design concept. It shows the advantage of technology as well as the liveliness of the historical heritage. Ancient history could adapt to contemporary intermedia design. Xiangshan county bears a crucial historical memory of the coastal defense of the East China Sea. Changguo Wei is the core figure in this memory. Utilizing ancient maps, paintings, poems, and other written records, the East Sea Frontier project creates a cultural identity that integrates a historical value. The Implementing interactive installations and immersive experience design expands the reconstruction of a piece of history in form and content. Ideally, the practice of the project would offer a positive solution to enhance the cultural tourism economy with proper entrepreneur strategies.

Abbreviation

TD*: Touch Designer; MST: Meta Space Tour of Changguo Wei; VRPN: Virtual Reality Peripheral Network.*

Declaration

Availability of data and materials

The data used and/or analyzed during the current study are available from the corresponding author.

Competition interests

The authors declare that they have no competing interests.

Funding

The authors declare that they receive no funding for this paper's research and authorship.

Authors' contributions

QCX: conceptualized the project, did field investigation, provided lab recourse, wrote the main body of the paper, and supervised team members' work. ZWJ visualized the Light Matrix installation and contributed the relevant part of the paper; ZDN, LST, LSY, and LY visualized the Mapping Ancient Xiangshan County and the Virtual Armor installations and contributed the relevant piece of the article. All authors developed the Meta Space Tour of Changguo Wei.

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Letter from the Chairman's Desk
By Sunil Bhatia PhD

I ordered soup for my dinner while staying in a hotel and requested room service. A person from room service carried the specific soup that was so filled that the bowl was brimming over. I found there was no sign of spillage in his wheeled trolley in which the bowl was placed over the platform. I minutely observed any sign of spillage of soup around the outer surface of the bowl but it was missing. I appreciated his skill and said, "How did you bring the watery soup with such precision that there was no spillage around the soup bowl and trolley platform." I further added the question "You did not experience the slightest jerk anywhere during your traveling by pushing the serving trolley. The soup was quite thin and close to the thickness of water." He looked at me while serving the soup as if your question had no relevance and was conveying it is possible out of our professional training to serve the customer neat and clean with a proper aesthetic value that should not only be tasty but pleasing to the customer's eyes. I again asked the same question "Have you not experienced any spill of soup while transporting to me?" He found my question insignificant but customer satisfaction was part of his professional duty. "We have a mostly vertical distance of several floors that we covered by state of the art elevator and it is so sophisticated there is no jerk at the time of start/stop, so no question of spill. While coming to your room we have a floor so smooth that the trolley

wheel does not experience any jerk so the spilling is out of the question." That moment I realized the accessibility standard should be framed where there should not be a spill of water filled over the brim of the glass while transporting is the ultimate objective for which every designer should work. I concluded only the design of transportation was with vertical height and horizontal on floor succeeded in delivering to my room. Slope is not the absolute solution it is make make-shift temporary arrangement. If designer solve the issues related to vertical height and horizontal distance travelled that never create any sought of hindrance is the ultimate goal of accessibility. Wherever the designer introduced the slope platform and followed the prescribed specified standard for slope proved not as effective as what we see in the use of elevator and smooth surface of horizontal distance. I have seen differently abled people struggle hard to climb heights on using slope and going down scare them for controlling the extra speed of a wheelchair and their entire energy is exhausted in managing that situation.

One day I was waiting for my car to pick me up at the certain point where a cow was grazing nearby in the field. Her subconscious mind was focused on stability not falling while taking steps. Her leg movement was as she moved front one leg her diagonal rear leg was in motion for forward movement. I found her three legs while lifting the diagonal leg were making such a design for bearing her body load and providing the highest stability not to fall. It is the cow's body that is seeking movement but stability should be at the highest level that should not allow fall to make her use her four legs as she takes the front leg the corresponding rear diagonal legs move forward. In this situation, a cow's body's weight and desire to move forward was designed

possibly keeping her body weight and instability that can instigate fall and hurt. Animals have instinct and even a monkey jumps from one branch to another considering that branch will have that strength that will bear his body weight. It is body weight and his experience trained his subconscious mind in such a fine way that allows him to select the branch before leaving the one he is holding that has enough strength to carry him. Catwalk is famous because her four legs are in a straight line and even though she never falls because of her light body weight.

I was injured and used my almighty will to stand but my leg anatomy was such that it did not support me to stand straight. In the same way, a dog cannot stand straight because his rear leg does not support and experiences an unstable waver like. If he exerts all his forces for standing he can manage for a few moments by making his body straight and ultimately changes to a position that he finds comfortable, not taxing, at ease, and stable in standing on four legs. His body will stretch straight but his leg will be not straight and always remain limited in the position of the slope. Monkey anatomy is different from dogs but similar to humans and if one wishes to walk on two feet it is possible for them. The horse walking on his rear legs is surprising and that helps in limited entertainment in the circus for audiences.

My friend's son was in his arms and he got up to start the ceiling fan’s piano switch by pressing from the board fixed within his comfortable reach in the vertical wall of the room. It was designed and fixed so that any adult with an average body structure can operate the switch facing no difficulty in the accessibility of the board and it is placed at such height that it is not within reach of a child. The child insisted that I would do it.

My friend moved the child holding it in his arm allowing him to press the desired switch for the fan. He pressed the switch but the design of the switch was that it pressed on and the child enjoyed that moment and found the fan was rotating. He again insisted on pressing the switch off. My friend pressed for the off position of the switch and the child did the pressing to put the switch on. My friend expressed his hesitation and thought to calm down. All effort was in vain and as the child pressed the switch it turned off. He quickly pressed again to put the fan on.
The switch was guiding the user that you pressed any manner there are only on and off.

A child was playing with a tightly caped and concealed Coke bottle sitting on the floor. He was trying to make the bottle stand on the floor and I started observing his behaviour. He was unaware of my presence but he was trying all possible ways to prevent the rolling of the bottle on the floor and he was unaware that the concept of stability is possible while allowing the bottle to stand on the floor with the bottom base. He struggled a lot but made the small bottle stand firmly on its base. He left the bottle and moved in another direction by crawling.

The design of the bottle was such that the mouth was narrow and capped which never allowed it to stand on the mouth of the bottle and it is possible in one position from its bottom base designed with a broad surface. As a child was experimenting the design of the bottle was unstable and it was the bottle guiding to achieve stability by allowing it to stand on the bottom base. The bottle' body is round (it helps in cleaning and is the most suitable design for mass production)it moves wherever the surface is low and it is a highly unstable situation. Bottle design keeps the child

looking for such effort where stability is high and ultimately succeeding in making it stand firm by placing the bottom.
My aged friend always mentioned that while cooking I picked up the cap thinking it would fit into the specific bottle. As he tried to fix it he found either the mouth of the bottle was improper or the cap was not designed for that bottle. He realized his mistake and corrected it by picking the cap that was designed for that specific bottle. The user is guided by the mouth of the bottle or cap.

Our ancient wisdom is remarkable and people were aware that the product is guiding for shaping it. They observed and found that lava is liquid as long it has high heat and turns solid as gets cool and acquires the shape in which it is placed. Earlier they might be using the concept of forging where they heat the metal for softening and giving the shape by striking the external force. It was useful for limited design for achieving certain shapes. As society advances, it experiences complex situations that should be handled with a need for various complexities of items that are not possible with forging. The idea of forging was replaced with casting and the idea of mould design emerged. The real problem was faced with making the desired metal into liquid and it required high-intensity heat that should be in position to melt the metal. They found a supply of extra air helps in getting the high-intensity temperature of fire of a designed leather bag with a nozzle-like mouth for pumping air into a burning fire. That concept revolutionized the design of casting and various moulds initially made with earth mud were created by pouring the molten carefully into it allowing it to cool for a permanent desired shape. It was the product of the mould that allowed the user to act accordingly.

A forest ranger found a snake trying to swallow the large rodent but facing difficulty. The dead rodent could not out of his mouth and the snake's mouth was not that big to swallow. That ranger helped the snake with its food by pushing the body of the rodent into his mouth with his holding stick.

That moment I realized the size of the opening of our mouth made our ancestors make the food into that size either using their teeth or designing various sharp tools to cut the large foods into that size. They designed various sizes of knives. Cutting food by-products helps in faster cooking, boiling, frying, or baking by increasing the surface area of vegetables or prey. The design of frying, baking, or boiling further helps our digestive system as well as kills the unwanted bacteria in it making us safe and healthy to digest properly. One day my mother prepared an Indian dish of Khichadi (A dish made of rice and lentils) by adding ingredients of washed rice, pulses, and cut vegetables along with spices for boiling in a pressure cooker to prepare the paste-like mixture. After a few days, she served me boiled rice and pulses along with fried vegetables separately in a separate bowl to prepare my choice dish by adding cooked items to my plate. That time I realized Khichadi dish has no choice of preparation for a person according to the taste he likes and that what is served is the ultimate choice for the users but serving cooked items separately has an element of choice for the user to prepare a mixture of his choice.

I noticed the ranger in the forest designing the catching tools for the animals according to the defense assets in their body. Snakebite is dangerous for humans because of the poison glands in the mouth so they designed the device that helps in controlling

the mouth. Once the mouth comes under control they catch the body of the snake. Similarly, the bird can fly so designed to control the wing's efforts by designing of net and it traps the leg. This design neutralized the power of the wing to fly or manual catch is to hold the wings tightly. Bulls can attack from their horn so they control by holding their horn. Here design of products guides humans on how to catch them. We have different trap designs because products are guiding for special traps for different animals. Elephant trap is a deep pit covered with green leaves. I have noticed in modern times catching a rat in small houses is extremely difficult and rat cages or medicated cakes are sometimes ineffective in controlling it. I found the gummed paper placed on the floor and as the mouse or rat passes his legs are glued and unable to come out of that trap. It is an inhuman design because the glue is so strong that trapped rats never separate from glued paper even after human intervention and die of starvation and lack of water.

I remember the days when I was a senior student in school and was playing ball with my classmates. There was a rule that the ball could be hard hit with all mighty force by holding a person to anyone in the game. I found my friend was close to me and I was thinking of hitting the ball with all mighty force. As he noticed the ball-holding person was close and could hit any moment he started running backward showing his front to me. Both hands were in position to defend from the hitting ball. I experienced there was no safe place where I could hit that confusing moment that gave me time to run out of my hard-hit range. After the game was over I questioned "Why didn't you run showing your back?." He said my back is square and the other person enjoys hitting with that largest possible area with his all mighty force. As I run

backward my face is visible and I can stop or lower the intensity of the hit of the ball with my both hands. A hitting person's mind looks for a place that he finds is not proper to hit and as a result, he hits with half-heartedly. That way I saved myself from being hit hard by him. I designed my body for a hitter to act accordingly.

I was watching a James Bond film where he is chased by some goons and he wishes to escape with the help of a motorboat. He pulls the string many times but the engine does not start as he finds goons are close. A child standing close to his motorboat turned the knob off the fuel tank and the motor started and saved his life. Here James Bond is considered the most intelligent spy on earth but the product failed to guide the user and knowledge of the child saved his life in escaping. Here the child observed the mechanism of the start of a motorboat and learned the method and procedure for starting. Our designed product should eliminate the standard way of operating the product by observing and learning rather the product should guide how to make it function as it is designed.

When the woman placed the child close to her breast the newly born child locates the nipple of her and starts sucking. If a mother does not allow for breastfeeding she experiences pain in her breast and that makes her breastfeed. The other child even has not opened his eyes but is trained in sucking her nipple with his thumb in her womb. All mammal children know the art of sucking the nipples during breastfeeding. I am surprised by the case of the tailor bird that makes her nest before the birth of her children. Still chicken after getting maturity follows the same tradition of making the nest as her mother prepared for them. Who guides them to design and make the nest? Our designers feel that a

manual is a must for the proper function of their designed products. It shows they rely only on limited human learned knowledge but nature works in different parameters and levels that are beyond our thinking and imagination. A colony of honey bees in search of safety travels a distance that is beyond their total life and has to rebirth at least four to five times to reach their destinations that were traveled by their ancestors at a specific time for a specific place. We witnessed the same events and surprised those who guided them to reach the same place that their ancestors visited. There is no guide but it is working with perfection.

I request that designers should work on that level while designing products and services that use biological organs beyond their known capability. Just imagine the nonstop flying capability of a migratory Siberian crane of Russia traveling thousands of miles away to reach a specific pond or lake in Rajasthan India. Imagine the body capability of a bird that has that much strength and energy to travel to reach far-flung places around the world during specific seasons.

Modern-time designers are baffled by the technological environment around them and find their designed contribution will have no significant impact worth changing for such large complex societal systems around the world. I remind them that Benjamin Franklin, flying a kite on rainy days appeared as nothing much for the society. Even if Benjamin comes to life in the present day he will refuse to recognize the development in the area of electricity is possible because of his research findings that had the potential for significant change. It is the value of the society that creates ripple effects by picking that new loose thread to use for

their benefit with their limited knowledge and in totality such a revolutionary change that society has ever experienced. Agriculture scientists are true believers in what they experiment with in the laboratory. They designed a specific variety of seeds in a few kilograms at the lab level. If it is appreciated among local farmers in terms of yields or other benefits it will be so popular with ripple effects and growth geometrical progression over time that everyone is using the same variety for their fields and appears as if they were cultivating from centuries ago.

The designers should design a product that should be fit into society's basic values and not limited to biological capabilities but beyond genetic or more than that to make it operational by users.

I am thankful to Dr. Dolly Dauo of France for accepting our invitation and making this special issue a good one. Certain contributor wants to be recognized for their contribution and wishes not to be known by her face. We honor and respect her feelings. Dr. Dauo is highly meticulous in her job.

Lambert Academic publication for celebration of the 150th special issue by publishing a book by compiling editorials "Design For All, Drivers of Design" was translated into eight different languages from ENGLISH to French, German, Italian, Russian, Dutch, and Portuguese. Kindly click the following link for the book. "Morebooks", one of the largest online bookstores. Here's the link to it:
https://www.morebooks.de/store/gb/book/design-forall/isbn/978-613-9-83306-1

Enjoy reading, be happy, and work for the betterment of society.

With Regards

Dr. Sunil Bhatia

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Forthcoming Issues

November 2023 Vol-18 No-11

Prof Dr Ravindra Singh,

Department of Design, Delhi Technological University, India

Email: ravindra@dtu.ac.in

December 2023 Vol-18 No-12

Prof Manoj Majhi

With a Bachelor's Degree in Industrial and Production Engineering, a Master's Degree in Visual Communication

along with a Doctoral Degree in Design added with 8 years of using it in the Broadcast medium of Satellite Television, with at least 15 multimedia promotional, published every week a probing question kept nagging the creative mind, why am I doing this, who benefits from this etc. and around over a decade in design education. A decision to impart the knowledge I had acquired from my professional career to equip the education system to bridge the lacuna .The feel we have not yet explored the Iceberg of the information that is available in the Media, we seem to be at the beginning tip of the iceberg . This does inspire a creative person to try out things that have not been explored yet. Instead of re-inventing the wheel, we designers should be inventing innovative utility of the wheel for today's context. The research areas are primarily in Communication Design area (Graphic Design such as Animation), Interaction design and Product design.

January 2024 Vol-19 No-1

Dr Farnaz Nickpour

Dr Farnaz Nickpour is an inclusive and human-centred design researcher and educator. She is a Reader in Inclusive Design and

Human-Centred Innovation and director of The Inclusionaries Lab at The University of Liverpool. Farnaz has a track record of excellence in design research, teaching and pedagogy, with 40+ peer-reviewed publications and awards.She is the External Examiner to the joint MA/MSc Global Innovation Design (GID) programme at the Royal College of Art and Imperial College London, and University of Brighton BSc and BA Design programmes. She is a reviewer for the Journal of Engineering Design, Journal of Design Research, Strategic Design Research Journal, and Building and Environment Journal; Scientific committee of Design for Inclusion (AHFE) Conference; Fellow of the Royal Society of Arts (FRSA); Fellow of Higher Education Academy (FHEA); Member of Institute of Engineering Designers (MIED); and Professional member of British Industrial Design Association (ProBIDA).

Farnaz's research explores critical and contemporary dimensions of design for inclusion and human-centred innovation across healthcare and mobility sectors, with a core focus on advancing four strategic research themes.

March 2024 Vol-19 No-3

Prof Dr. Ketna Mehta

She is Founder Trustee & Editor (One World), Nina Foundation, a 22 years young NGO for rehabilitation of people with spinal cord injuries in India. She is an Author of two books; 'Nano Thoughts on Management' & 'Narratives of Courage, Lives of Spinal cord injury survivors in India'.

As editor, 36 issues of 'One World - Voice of people with spinal cord injury' has published since 2001 (www.nina foundation.org)

She is a thought leader on social and inclusive development of persons with disabilities, transformational change and leadership. She was invited to contribute a chapter in the popular book 'Chicken Soup For the Indian Spiritual Soul' ! India's very first literary festival by the highest circulated newspaper group The Times of India on 'Disability is a state of Mind.' Her action oriented, innovative and bold opinions on disability has been published in over 100 research papers, articles, book chapters, columns, blogs and interviews in the media. She has been invited as a Guest Editor for Success& Ability's first and only thematic issue on Spinal Cord Injury in 2012, two issues of 'DesignForAll' international publication focusing on 'Improving Quality of life of people with spinal cord injuries' & 'FutureSpeak SCI Rehabilitation' in 2021 & 2019.

She has been a Regional Consultant for WHO's first Research Report IPSCI (International Perspective on Spinal Cord Injury'. For the very first Rehab Exhibition, Nina Foundation was invited as the NGO Partner where a demo workshop of how Scoop Stretchers during the Golden Hour prevents a devastating spinal cord injury. Several Public Forums on spinal cord injury have been curated by her for spreading awareness.Since 25th June 2009

Nina Foundation has initiated a spinal cord injury awareness day. Their grassroots free SCI OPD & multi disciplinary camps have successfully gifted equipments, medicines, hope and solutions for living a life of dignity. In April 2017 was invited by UC Berkeley, California as a faculty jury to evaluate international live student projects on Universal ReDesign from various countries. She was invited as an Expert Speaker for CIVIL20 (G20) by Rising Flame for 'Women with Disabilities' Panel on 17th June 2023, American Consulate, Mumbai. Nina Foundation is also a PAB Member for SPINE20 (G20) as Speaker & Observer 10-11 Aug 2023.

Ketna is a spinal cord injury survivor since 27 years and lives in Mumbai India.

New Books

it is available on www.morebooks.de one of the largest online bookstores. Here's the link to it: https://www.morebooks.de/store/gb/book/design-for-all/isbn/978-613-9-83306-1

The Ultimate Resource for Aging in Place With Dignity and Grace!

Are you looking for housing options that are safer and more accommodating for independently aging in place? Do you want to enjoy comfort, accessibility, safety and peace of mind – despite your disabilities, limitations and health challenges? The help you need is available in the Universal Design Toolkit: Time-saving ideas, resources, solutions, and guidance for making homes accessible.

This is the ultimate resource for individuals and professionals who want to save time, money and energy when designing, building, remodeling or downsizing a home. The Universal Design Toolkit will help you take the steps to design homes for your clients or yourself while eliminating the costly trial and error challenges you'd inevitably encounter if faced with this learning curve on your own.

Rosemarie Rossetti, Ph.D., teamed with her husband Mark Leder in creating this unique Toolkit. They bring ten years of research, design and building expertise by serving as the general contractors for their home, the Universal Design Living Laboratory– which is the highest rated universal design home in North America.

Within the Toolkit's 200 richly illustrated pages, you'll find: Insights that distinguish *essential* products, services and resources from the *unnecessary*.

Proven, realistic tips for finding the right home.

Home features you need to look for. Nothing is assumed or left out.

Handy home checklists and assessments.

Interview questions to help you hire industry professionals with knowledge and experience. Photographs that provide a frame of reference to inspire, clarify and illuminate features andbenefits.

Valuable resources to save you time, money and energy.

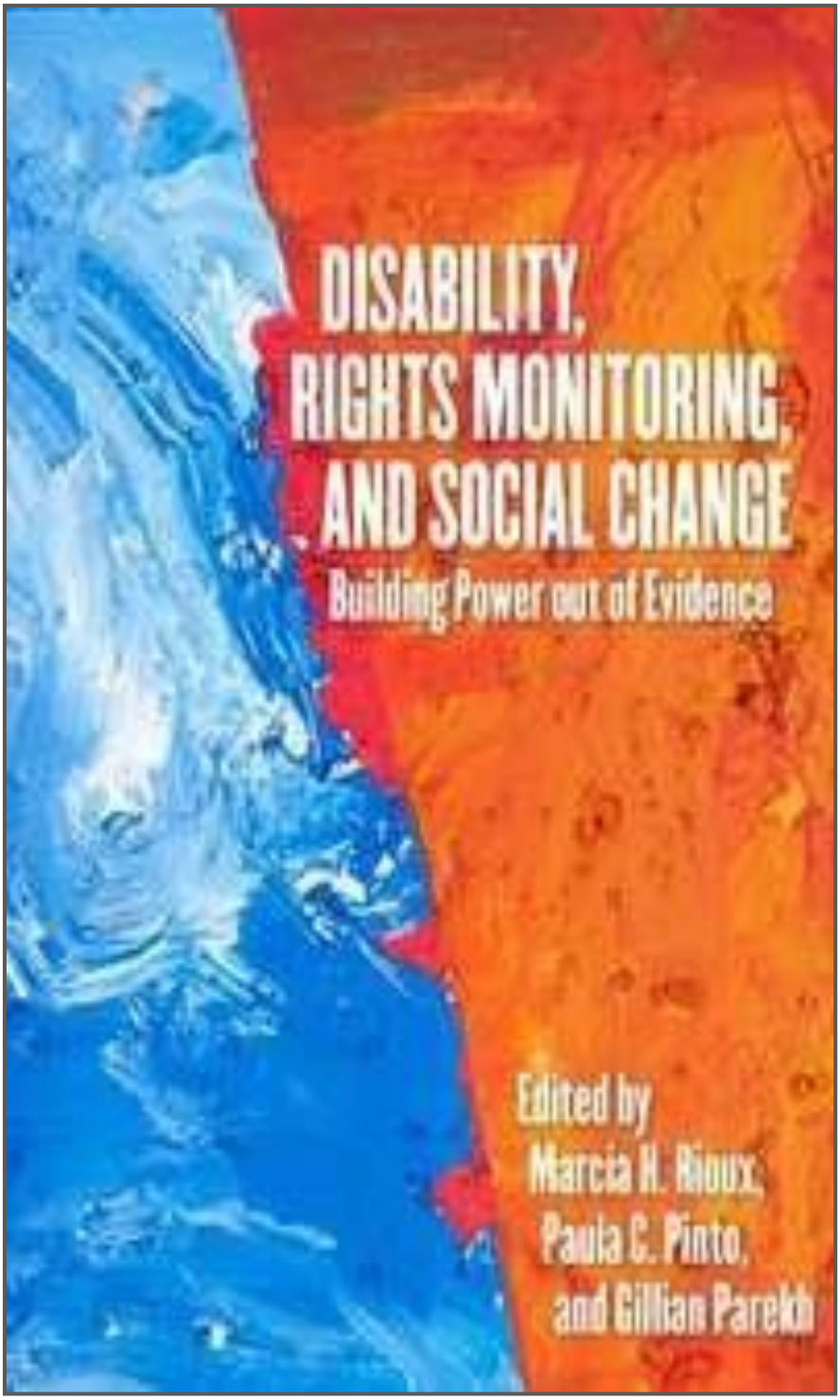
Helpful sources of funding.

Space planning dimensions for access using assistive devices such as wheelchairs andwalkers.

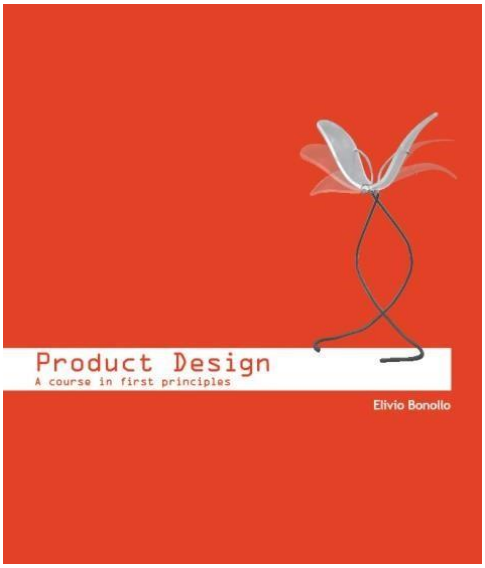
And so much more!

If you want useful, dependable advice and easy to implement ideas from respected experts who know the ropes, you'll love Rossetti and Leder's perspective. As a speaker, author and consultant who uses a wheelchair, Rossetti has helped hundreds of people design their ideal homes. Now her comprehensive Toolkit is available to help and support you! Get the Universal Design Toolkit now to start your project!

Disability, Rights Monitoring and Social Change:


DISABILITY,
RIGHTS MONITORING,
AND SOCIAL CHANGE
Building Power out of Evidence
Edited by
Marcia H. Rioux,
Paula C. Pinto,
and Gillian Parekh

New Update: ELIVIO BONOLLO (2015/16) PRODUCT DESIGN: A COURSE IN FIRST PRINCIPLES



Available as a paperback (320 pages), in black and white and full colour versions (book reviewed in Design and Technology Education: An International Journal 17.3, and on amazon.com).
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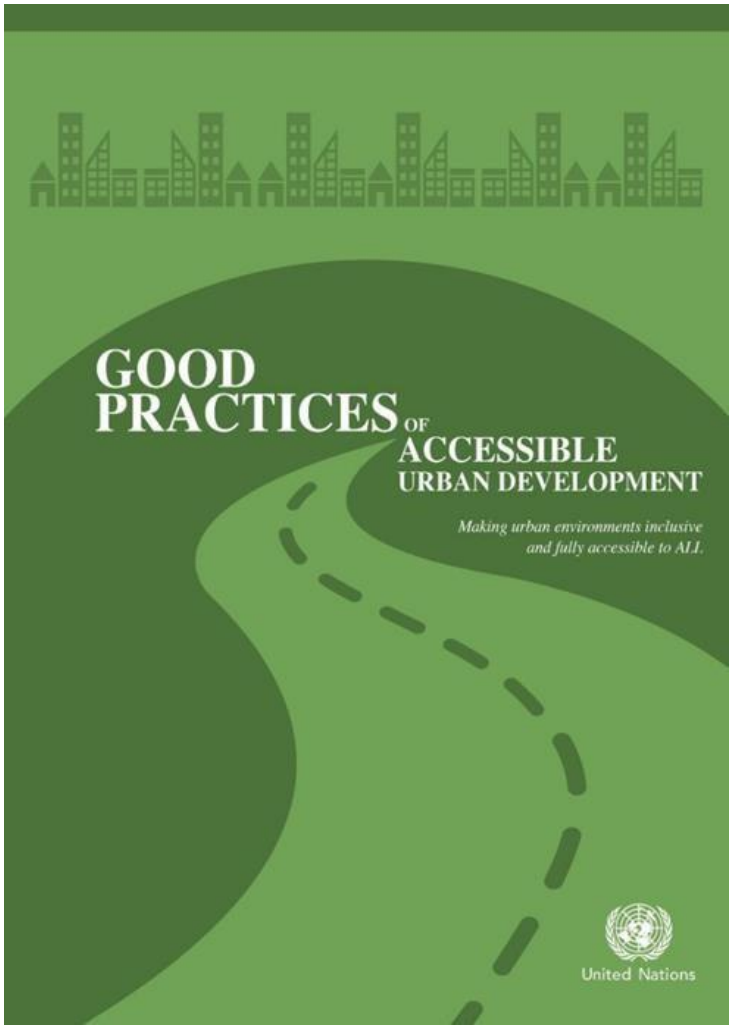
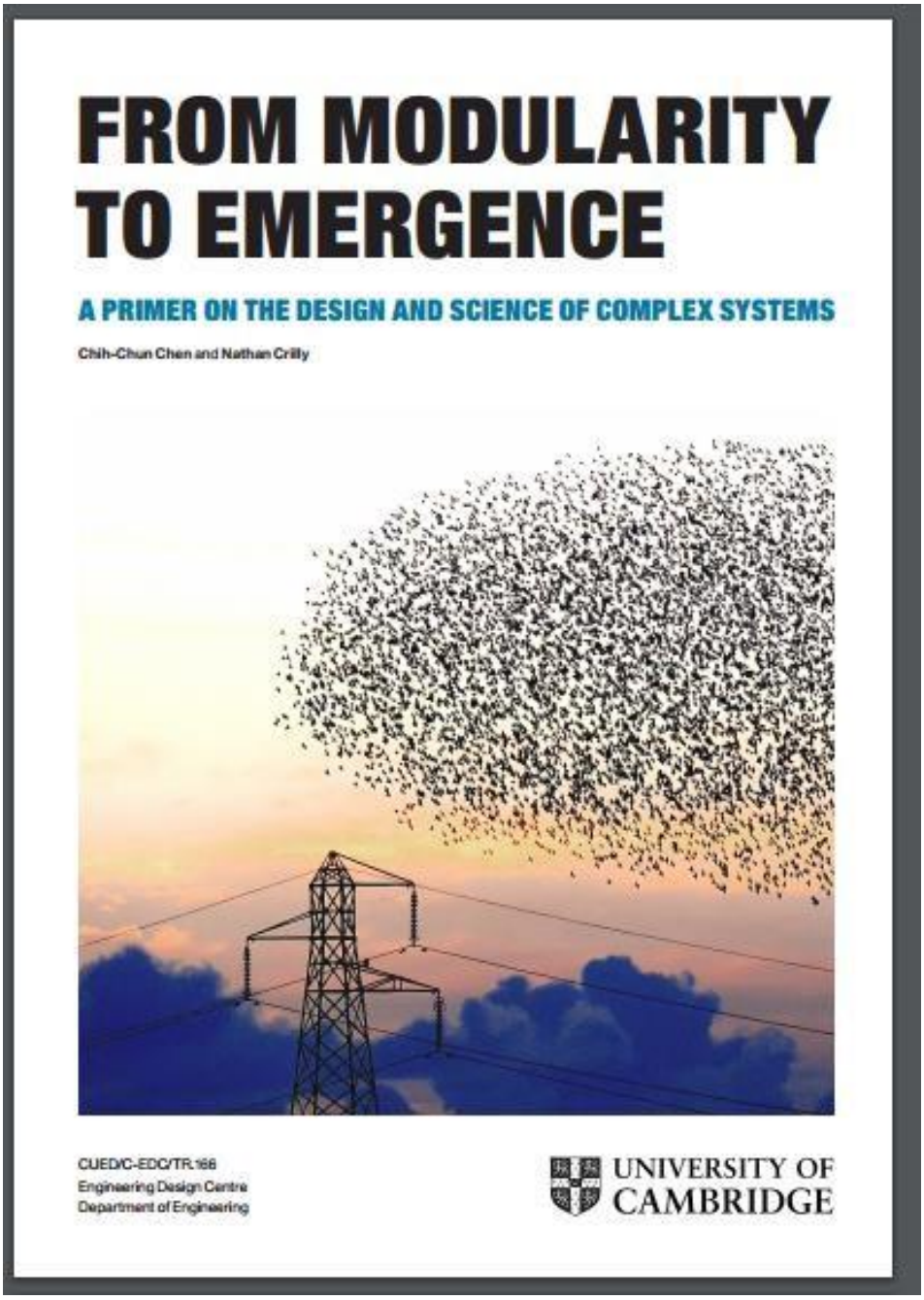


In light of the forthcoming United Nations Conference on Housing and Sustainable Urban Development (HABITAT III) and the imminent launch of the New Urban Agenda, DESA in collaboration with the Essl Foundation (Zero Project) and others have prepared a new publication entitled: "Good practices of accessible urban development".

The publication provides case studies of innovative practices and policies in housing and built environments, as well as transportation, public spaces and public services, including information and communication technology (ICT) based services.

The publication concludes with strategies and innovations for promoting accessible urban development. The advance unedited text is available at:http://www.un.org/disabilities/documents/desa/good_practices_urban_dev.pdf



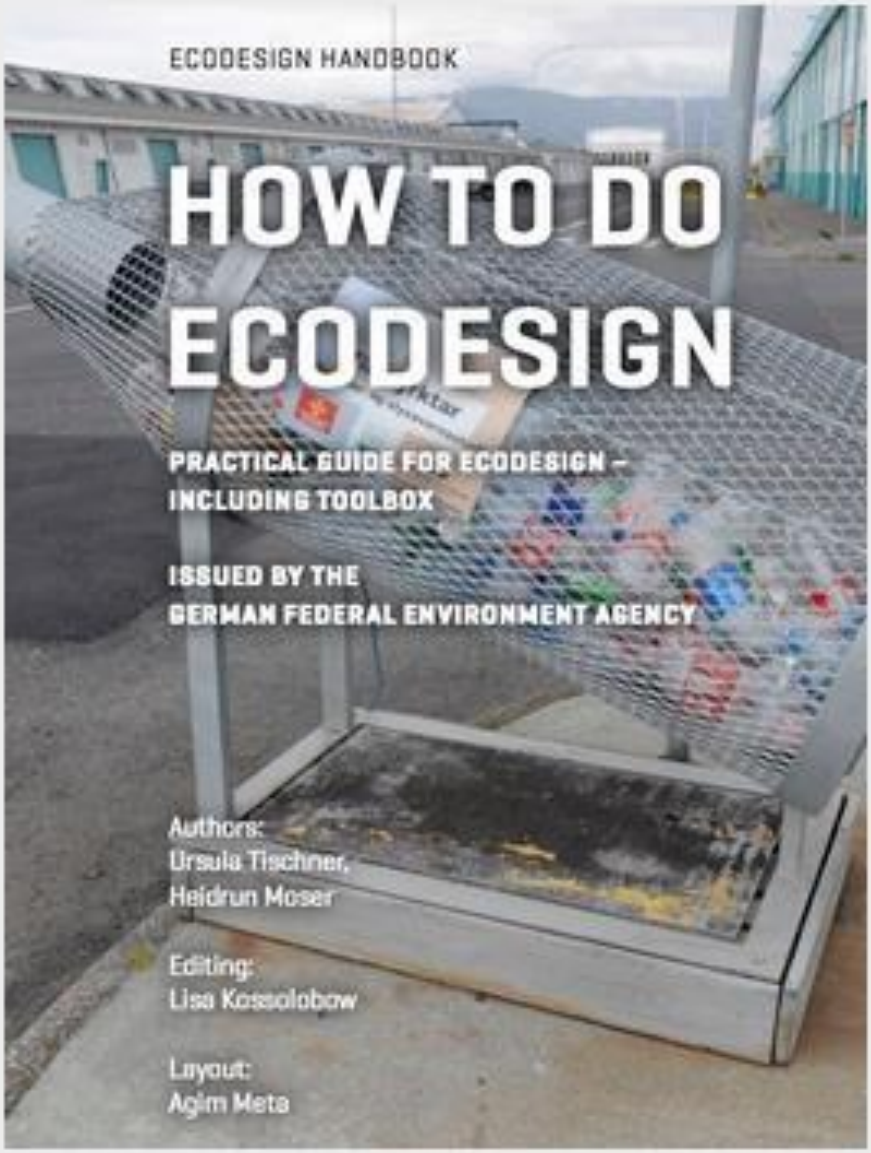
Dr Chih-Chun Chen and Dr Nathan Crilly of the Cambridge University Engineering Design Centre Design Practice Group have released a free, downloadable book, _A Primer on the Design and Science of Complex Systems_.

This project is funded by the UK Engineering and Physical Sciences Research Council (EP/K008196/1).

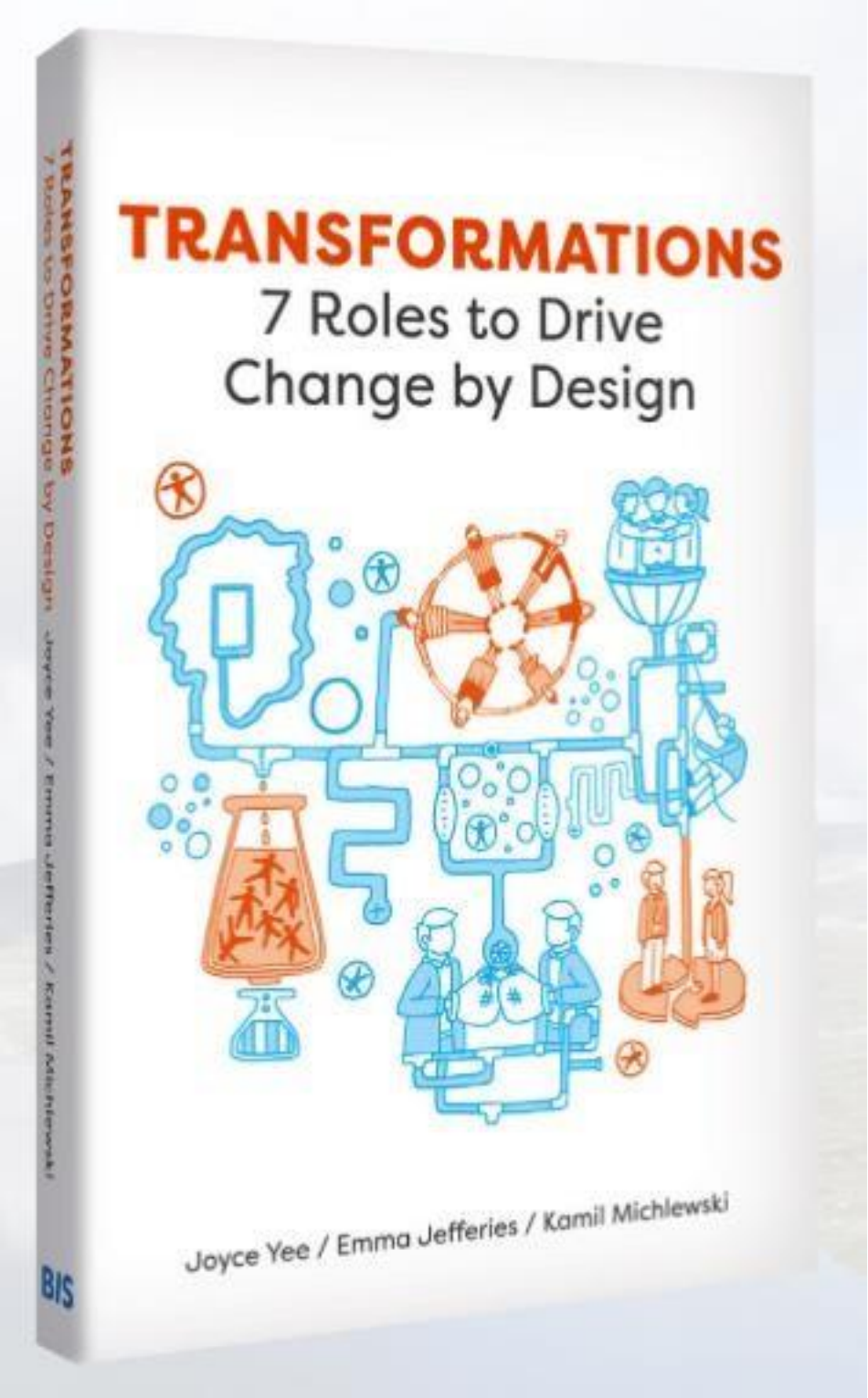
The book is available at URL: http://complexityprimer.eng.cam.ac.uk

Changing Paradigms: Designing for a Sustainable Future

New iBook / ebook:
HOW TO DO ECODESIGN



Practical Guide for Ecodesign – Including a Toolbox
Author: Ursula Tischner


TRANSFORMATIONS
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Change by Design
Joyce Yee / Emma Jefferies / Kamil Michlewski
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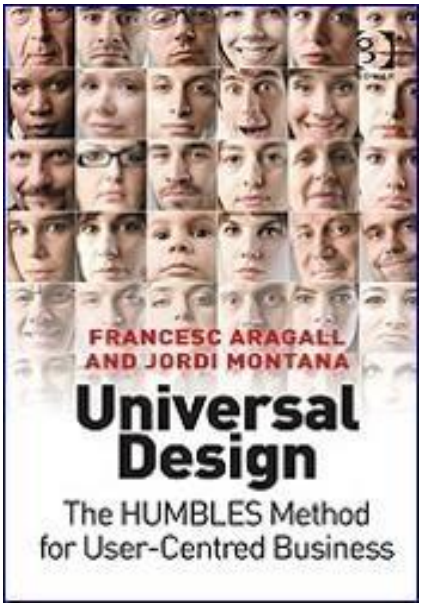
DEATH AND GOVERNMENTALITY
Neo-liberalism, grief and the nation form

Universal Design: The HUMBLES Method for User-Centred Business



"Universal Design: The HUMBLES Method for User-Centred Business", written by Francesc Aragall and Jordi Montaña and published by Gower, provides an innovative method to support businesses wishing to increase the number of satisfied users and clients and enhance their reputation by adapting their products and services to the diversity of their actual and potential customers, taking into account their needs, wishes and expectations.

The HUMBLES method (© Aragall) consists of a progressive, seven-phase approach for implementing Design for All within a business. By incorporating the user's point of view, it enables companies to evaluate their business strategies in order to improve provide an improved, more customer-oriented experience, and there by gain a competitive advantage in the marketplace. As well as a comprehensive guide to the method, the book provides case studies of multinational business which have successfully incorporated Design for All into their working practices.

According to Sandro Rossell, President of FC Barcelona, who in company with other leading business professionals endorsed the publication, it is "required reading for those who wish to understand how universal design is the only way to connect a brand to the widest possible public, increasing client loyalty and enhancing company prestige". To purchase the book, visit either the Design for All Foundation website

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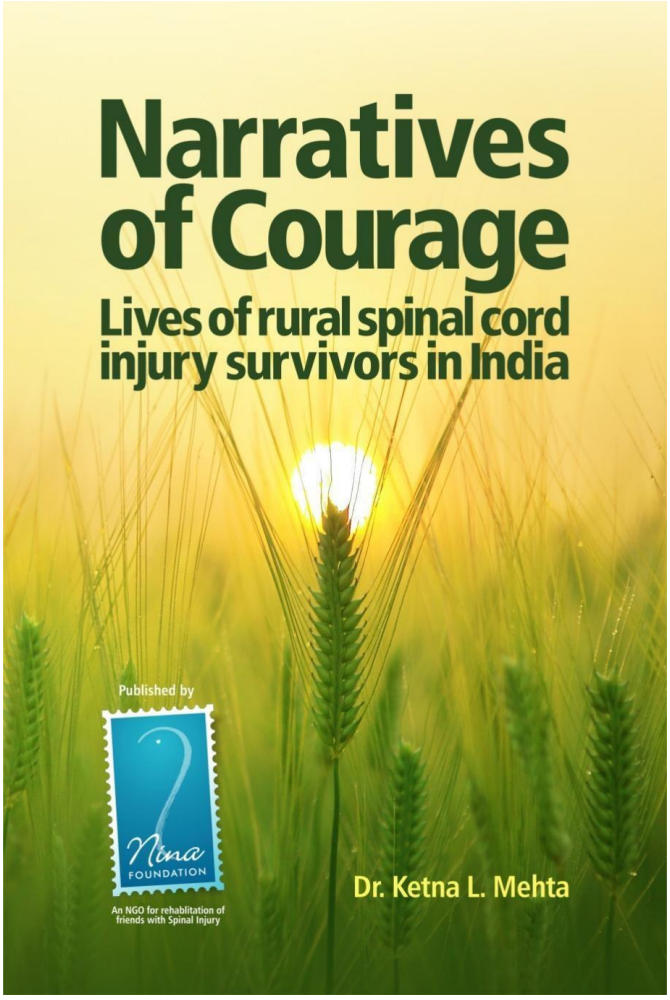


NOW AVAILABLE
Case Studies in Applied Behavior Analysis for Individuals with Disabilities (Second Edition)
Keith Storey, Ph.D., BCBA-D
Linda Haymes, Ph.D., BCBA-D
This book responds to a critical need for highly qualified personnel who will become exemplary professionals because of their advanced knowledge, skills, and experiences in working with students and adults that have varying disabilities, including Autism Spectrum Disorders (ASD). Since Board Certification for behavior analysts was introduced, there has been an expansion of training programs in Applied Behavior Analysis to meet the demands from school districts, health insurers, and families. In spite of these developments, a case studies book has not been available that uses the Behavior Analyst Certification Board Task List, Fifth Edition (BACB) guidelines for educating individuals receiving their BCBA, or for those in the field such as teachers, and service providers. The goal of this book is to fill that need. In this newly revised second edition, eighteen case studies are provided—case studies with complete analysis, case studies with partial analysis, and case studies without analysis. The format, readability, and detailed description of instructional methodology makes this text a valued resource for instructors and behavior analysts responsible for improving the skills of people with disabilities.
Charles C Thomas, Publishing is proud to announce the release of this second edition.
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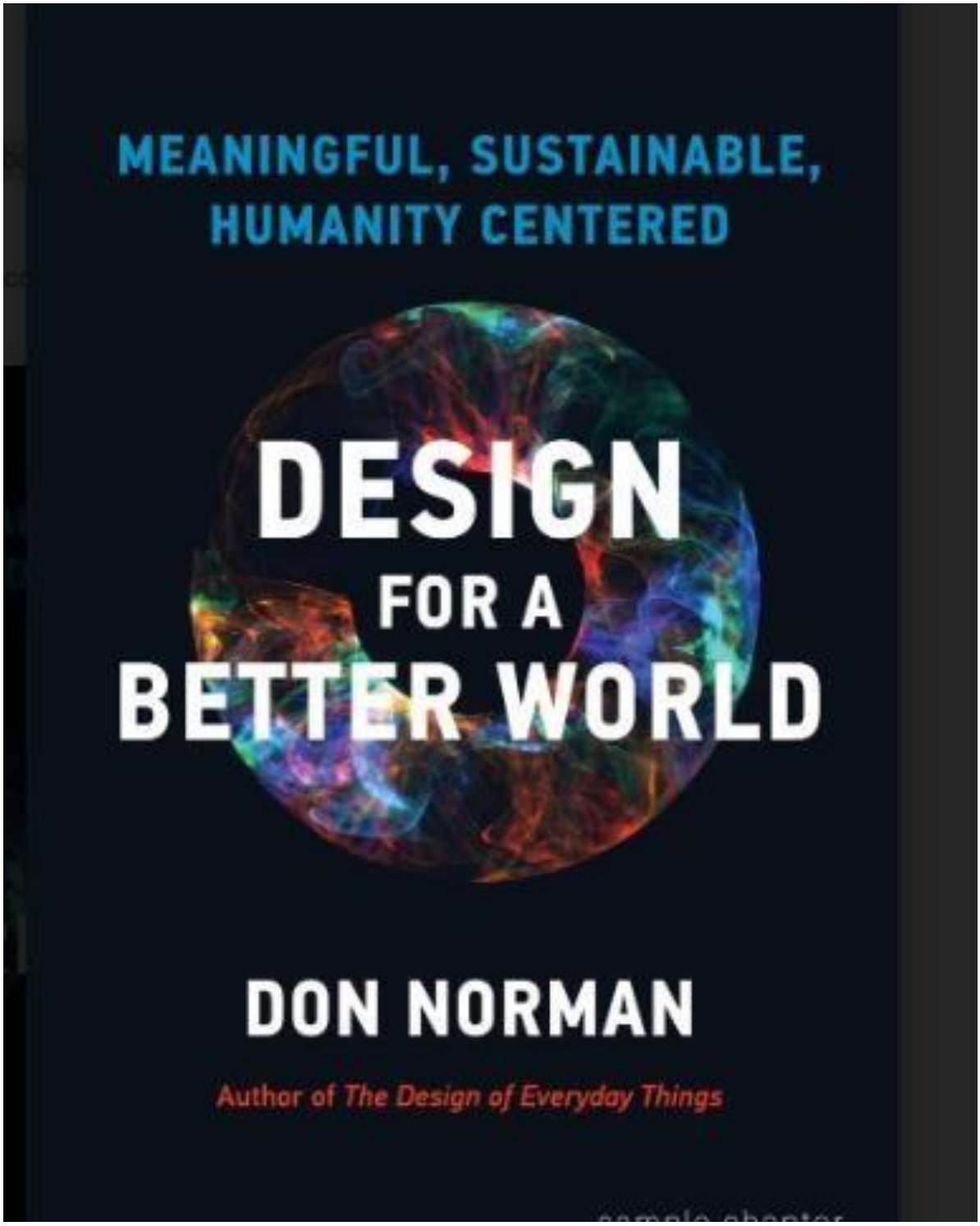

MEANINGFUL, SUSTAINABLE,
HUMANITY CENTERED
DESIGN
FOR A
BETTER WORLD
DON NORMAN
Author of The Design of Everyday Things

News

1. In Memoriam: Professor Emeritus Raymond Lifchez (1932–2023), pioneer of universal design

We are saddened to announce the passing of Professor Emeritus of Architecture and City & Regional Planning Raymond (Ray) Lifchez at age 90. Lifchez made a deep and lasting impact on the College of Environmental Design (CED), UC Berkeley, and the world through his teaching, advocacy for accessible design, and philanthropy.

Ray Lifchez, c. 2018. Courtesy CIL.

Lifchez taught at Berkeley for more than 50 years, beginning in 1972. He received the University's Distinguished Teaching Award in 1976 and the Berkeley Citation in 2008. He was also honored with the Association of Collegiate Schools of Architecture Distinguished Professor Award in 2002. This spring, Berkeley awarded him with the Fiat Lux Faculty Award.

"Ray was a valued member of the college, both during his 50-plus-year tenure as a professor and in the years since his retirement," says William W. Wurster Dean Renee Y. Chow. "He was an inspiring and generous teacher, remembered for his formative writing workshops and socially conscious studios. He embodied the Berkeley ethos in his insistence that the built environment should be accessible to all. He will be greatly missed."

Born in Columbia, South Carolina, in 1932, Lifchez earned his BArch at the University of Florida. He then headed north to New York to teach and study at Columbia University, where he was awarded both an MS in architecture and an MA in art history. It was in an art history course there that Lifchez met his future wife, Judith Lee Stronach, a journalist, poet, arts patron, and human rights activist. They married in 1967 and three years later moved to Berkeley, where Lifchez earned a Master in City Planning and then joined the CED faculty. Lifchez and Stronach were married for 35 years, until Stronach's death in 2002.

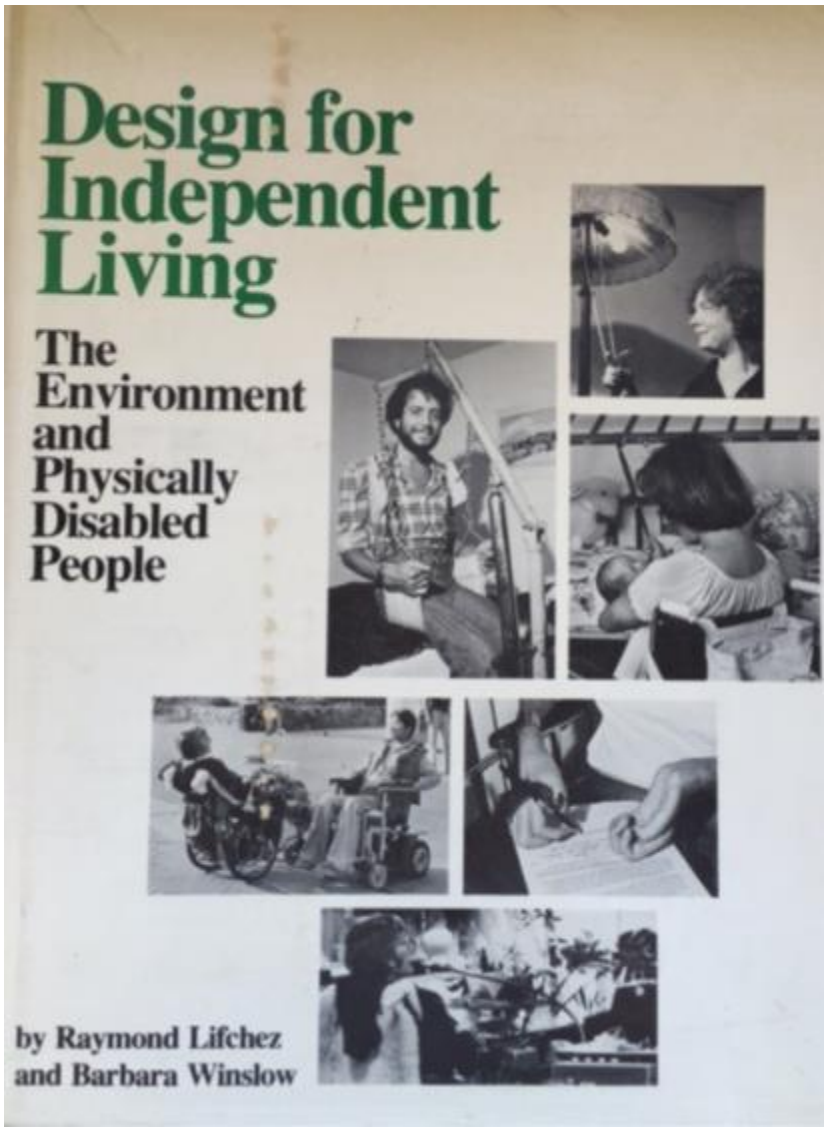
Lifchez was a pioneer in incorporating accessibility and disability justice into design education. Before coming to Berkeley, he had worked on renovating a New York state residential mental health facility, where he befriended patients with disabilities; there he learned that many of them were institutionalized only because the urban environment was physically inaccessible to them. He realized it didn't have to be that way when he arrived in Berkeley in 1967 — drawn in part by the school's reputation for social activism — and witnessed a city being reshaped by the nascent Disability Rights Movement.

"Ray played an important role in launching the independent living focus that became central to disability rights movements in the U.S. and then globally," says Frederick Collignon, professor emeritus of City & Regional Planning. "As a teacher, he trained and mentored many who have become leaders of designing for those with disabilities in professional practice, education, and government."

Ray Lifchez with students in his studio course, Architecture 101 Designing for People with Disabilities, 1970s.

Lifchez developed an innovative studio course centered around the concept of accessibility in architectural design, which he began to teach in 1969 while still a graduate student. In an unprecedented move, he invited people with physical disabilities into the studio as "clients" who advised on design projects. This predated by 20 years the idea that has become the motto of today's disability rights activists: "Nothing about us without us."

The course, Architecture 101 Designing for People with Disabilities, fit neatly into the college's program on social factors in design, which taught students the importance of making buildings and environments responsive to human needs. Lifchez encouraged his students to be empathetic and to consider broader questions about life as a person with disabilities in a world constructed for the able-bodied.



Lifchez published two books about universal design based on what he learned though his teaching, *Design for Independent Living: The Environment and Physically Disabled People* (UC Press, 1979) with co-author Barbara Winslow, which was nominated for a National Book Award, and *Rethinking Architecture: Design Students and Physically Disabled People* (UC Press, 1986). He also advocated to admit students with disabilities into the department and played a leading role in one of the earliest projects to assess the accessibility of campus buildings for wheelchair users. He was a faculty leader in the creation of the disabilities studies program on campus. Lifchez was also involved in the protests that led to the implementation of Section 504 of the Rehabilitation Act of 1973 that created legal rights for people with disabilities in California and eventually led to the federal Americans with Disabilities Act (ADA). More recently, he served as an executive producer of the Academy Award–nominated documentary *Crip Camp: A Disability Revolution* (2020).

In 2018, the Center for Independent Living (CIL) awarded Lifchez the Ed Roberts Day Award, which honors those who have made significant contributions to the Disability Rights Movement. With other Berkeley faculty, he had assisted in the conceptualization and work of CIL, which then influenced the development of similar centers across the U.S. and then the world.

"What Ray did with Berkeley as his base (and sometimes as his collaborator and often as his beneficiary) changed the world," says Professor Emeritx of English Susan Schweik, who was involved with the development of disability studies at Berkeley for over 25 years.

***Ray Lifchez (second from left) with Chris Downey, 2021 Lifchez Professor of Practice in Social Justice; Jeffrey Mansfield, 2022 Lifchez Professor of Practice in Social Justice; and Professor Emeritx of English Susan Schweik*, 2022.**

CED carries forward and honors Lifchez's vision with the Lifchez Professor of Practice in Social Justice, an annual visiting professorship endowed by a $2.5 million gift from Lifchez. Since its inauguration in 2020, the college has awarded the professorship to architects Chris Downey, who is blind; Alan Ricks, a co-founder of MASS Design Group, which is dedicated to design that promotes justice and human dignity; and Jeffrey Mansfield, who leads MASS Design Group's Deaf Space and Disability Justice Lab.

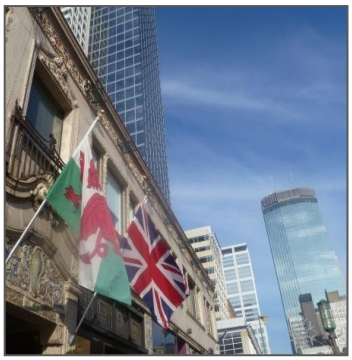
In addition to the endowment for the Lifchez Professor of Practice in Social Justice, Lifchez generously sponsored multiple other campus programs, prizes, and fellowships. Many of these honor his late wife's passion for poetry and their shared interest in art history. At CED, these include the Berkeley Undergraduate Prize For Architectural Design Excellence, the Judith Lee Stronach Undergraduate Summer Scholarships, and the Richard Bender Fellowship Fund. He also donated the Raymond Lifchez and Judith Lee Stronach exhibition cases to the Environmental Design Library.

Elsewhere on campus, Lifchez endowed the Robert Hass Chair in English; the Judith Lee Stronach Baccalaureate Prize in the College of Letters and Science; the Raymond Lifchez / Judith Stronach Art History Travel Endowment; and the Judith Stronach Literary Prize for Re-Entry Students.

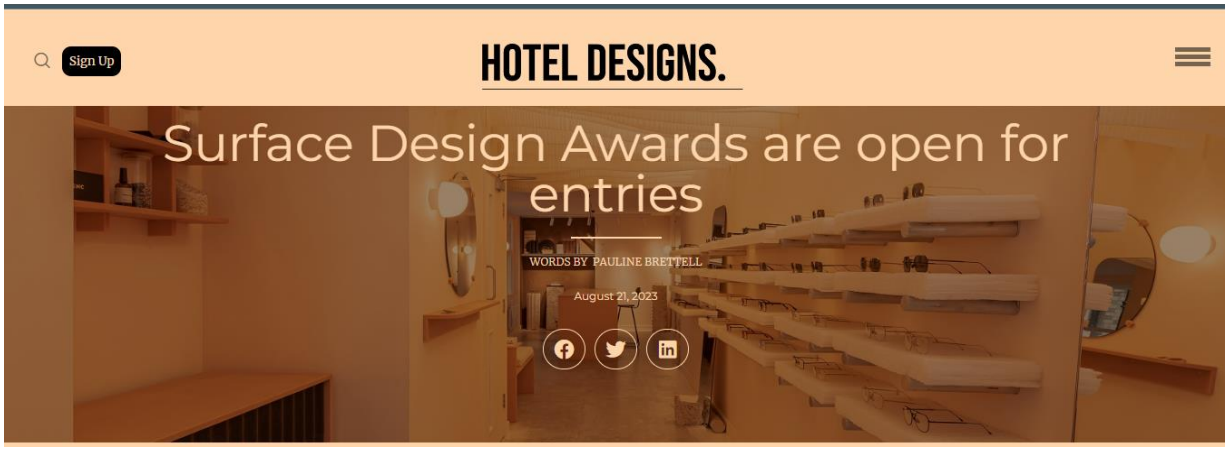
"Ray's philanthropic legacy serves as a powerful testament to his unwavering dedication to bettering society. His impact resonates not only within CED but across our entire campus community," says Kim Anthony, CED interim assistant dean of development and alumni relations.

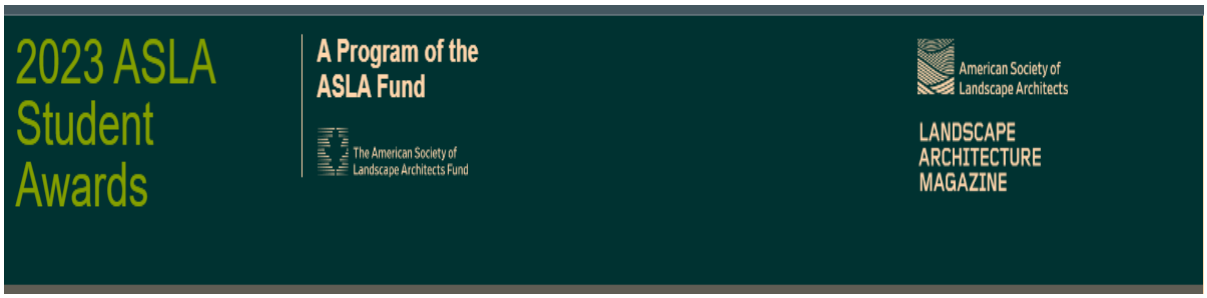
As a teacher, mentor, advocate, activist, and philanthropist, Lifchez left a legacy far beyond UC Berkeley. His belief that the built environment should accommodate people of all sizes and shapes, all ages, and all levels of physical and cognitive ability has changed not only our cities and buildings but our attitudes as well. Generations of his students carry forward his message that "universal design welcomes and celebrates all users."

Courtesy : Berkeley Collège of Enviromental Design)



Programme and Events





Lasr Date 27-30 October 2023.

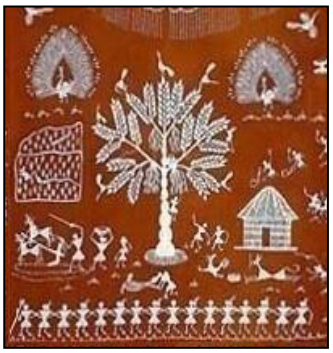
TypoDay 2023

26th, 27th & 28th October 2023
Department of Applied Arts, FoVA, BHU, Banaras
www.typoday.in

Typography Day will be held for the sixteenth time on **26th, 27th and 28th of October 2023** hosted by Department of Applied Arts, Faculty of Visual Arts Banaras Hindu University, Varanasi (BHU Varanasi) in collaboration with the IDC School of Design (IDC), Indian Institute of Technology Bombay (IIT Bombay) with support from India Design Association (InDeAs) and Aksharaya.

The theme for this year's event is **'The Sacred and Typography'**

The event will feature workshops on Typography and Calligraphy followed by conference dedicated to 'Sacred and Typography'. The international conference will be devoted to addressing issues faced by type designers, type users and type educators. The conference includes presentations by invited keynote speakers, eminent academicians, industry professionals, research scholars and students. The event will also host an exhibition of selected posters from the Poster Design Competition.



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