

ARE WE ASKING THE RIGHT QUESTIONS? RETHINKING POST-GRADUATE DESIGN EDUCATION TOWARDS SUSTAINABLE VISIONS FOR THE FUTURE

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ABSTRACT

Our society is currently facing complex challenges, such as climate change, loss of biodiversity, ageing population, unemployment, to name but a few. This has created growing expectations on designers and engineers to explore, experiment and implement innovative solutions to such issues. At this critical time, if we want design to be part of the solution, we need to wonder whether we are asking designers suitable and sustainable questions. Both in post-graduate design education and in business, the brief still overwhelmingly requires designers to follow a linear problem-solving approach that focuses on product rather than strategies, services and systems. Traditional design briefs result no longer appropriate to face the challenges of our unsustainable world, as they relate to market, growth economy and human needs rather than society, business models and the needs of nature. Instead, we need to be asking questions about, for example, how we overcome the barriers for change, create sustainable business opportunities, and facilitate the process of innovation through design methodology. If the role of design is to create new visions and outline strategic directions towards a sustainable future world - for policy makers, businesses, communities and individual citizens - we need those stakeholders to create briefs for designers that allow them to do that. This paper will explain how the reframing of questions has been embedded into SustainRCA's teaching practice in post-graduate design, art and engineering, leading to the development of new tools and methods, as well as some innovative outcomes.

Keywords: Design brief, holistic sustainability, systemic design, future design education, SustainRCA.

1 INTRODUCTION

We are living under the shadow of a great economic crisis, which will lead to unimaginable disruption of our social and environmental systems [1]. In the last decades, raising energy costs, decreasing resources, tighter legislation and a greater public awareness are creating a fertile ground for bringing sustainability at the core of all design work [2]. This is opening up the opportunity to shape a new kind of designer as driver for sustainable futures, developing new business models, taking radical creative decisions to shape policy and the economy, and engaging society in environmental challenges [3].

Within the rapidly changing world of today, design is consequently becoming a blurry discipline, showing more scope for redefinition, criticality and cutting-edge visions. Academia in the design world has the potential to provide strong leadership in terms of a mature research base, supporting post-graduate research students, contributing to and collaborating with research in related disciplines or professional fields. The UK has proved to have a real strength in service design as a practice, but the research landscape is still emerging and needs to be nurtured with a mindful agenda [4]. There is also an incomplete historical understanding of the development, reach and impact of social design. Furthermore, funding for social and service design is still scarce and often aims at short-term projects, rather than long-term programmes for building new knowledge [5].

2 A NEW ECOLOGY OF THE DESIGN CULTURE

Education will play a key role in creating a critical mass of new design (and non-design) professionals able to drive the transition from a consumerist economy towards a sharing [6] and circular economy

[7] shifting from material consumption to collaborative consumption [8]. This changing paradigm is creating growing expectations among students, academics and professionals. Students are required to broaden their skill sets to face issues outside the traditional remit of design. At the same time, academics are expected to meet students' changing interests and integrate new ways of designing to responsibly drive the transition towards sustainability. In order to implement such a transition, disruptive changes need to invest both academic design education and training for professionals and organisations to adopt a holistic framework and updated design tools to support this changing design scenario. The goal should be a healthier, happier, fairer and more sustainable life, within our environmental limits, while respecting social justice and economic equity [9]. Design briefs must be reframed to address this kind of holistic thinking, considering the four pillars of environment, economy, society and culture [10] in order to achieve economic resilience while improving the quality of our lives and that of the environment. To get there, it is necessary to develop a new ecology of design culture, beyond the anthropocentrism that has traditionally characterised design education and has placed the man at the centre of the universe, valuing all other living beings in relation to their usefulness to us. Instead, a new bio-centrism must be proposed and the worldviews of the designer and audience alike must be shifted. This means acknowledging humans as one species amongst many, all with intrinsic and instrumental values, and focusing on the sustainable interdependence between diverse ecosystems (Figure 1). For instance, this framework was applied by SustainRCA, an independent research unit at the Royal College of Art (RCA), in the Chicken Run project, where user journeys were created for farmers, consumers and also chickens, in order to design and establish a more sustainable and higher welfare poultry industry [11].



Figure 1. Towards a bio-centric worldview. Source: Rawles, K. [12]

3 EDUCATING THE “O-SHAPED” DESIGNER

Design schools must be primed to train the new agents of sustainability, replacing the “T-shaped designer” [13], having a broad set of skills and specialisation in one sector, with the “O-shaped designer” having a circular and systemic mind-set [14]. To design complex service systems, design education is already embracing students from various disciplines (fine arts, engineering, social sciences, etc.) while addressing a new demand from the market for designers able to work in cross-disciplinary teams. Responding to this demand would help create intelligent and sustainable collaborations between social, political and economic realms, and push the expansion of design research into new domains such as policy-making, public services and circular economy. The designer should become facilitator of a participatory design process, envisioning future scenarios for sustainability and social innovation, collaborating with a complex network of actors. Such a multidisciplinary collaboration can meet the urgent needs for social innovation, while developing long-term platforms beyond final products. The focus needs to be not only on the design of physical things, but on the process and organisational conditions necessary to drive new systems. The designer must be trained to create the “hard” (places, facilities, equipment, technology) as well as the “soft” (network, people and relationships) infrastructures for encouraging such systemic changes.

4 THE DESIGNER OF MICRO-ENTERPRISES

Given the rapid pace of innovation, designers should be primed to intervene at earlier stages of the design process and in a more strategic way to face the challenges of the contemporary world, such as

increasing interactivity, connectivity and co-production. In order to face social, environmental and economic challenges designers must shift from a problem-solving attitude towards a goal-focused mind-set, and outline strategic directions to support resilient businesses. Furthermore, designers must be primed to be agile, act independently, with the skills to set up new kinds of social and environmental enterprises. Nowadays, an increasing number of young designers are no longer specialised in a particular kind of production, rather are exploring self-production. Here, a combination of analogue and digital technologies is used, and all the aspects of an enterprise, from design to production, distribution and communication, are self-managed [15]. By designing the complex system of an enterprise, the designer can develop a more mindful and integrated approach to the project, increasing his/her ability to interact with a range of different professionals throughout the process. A mindful example of a young social entrepreneur using 3D printing to tackle environmental issues (i.e. ocean acidification and loss of biodiversity) is the recent RCA MA Innovation Design Engineering graduate Nell Bennett. *Coral3* (Figure 2) is a 3D printed rock, an alkaline substrate structure mimicking fractals and coral shapes. A natural algorithm allows water flow to dissolve the alkaline structure evenly over time, increasing the pH value of the ocean water surrounding endangered coral reefs. This project is envisioned as a large-scale social enterprise involving many stakeholders (from subsistence fishermen to dive tourists) and aiming at providing local communities with economic and environmental benefits, as well as increased awareness [16]. Self-production experiences like this represent the act of “mediation between areas of knowledge” [17], the bridge between craftsmanship and industry, as a response to the current crisis in the work world. The intent of self-production is not to propose a nostalgic return to a regressive craftsmanship, but rather to explore new models of flexible and redistributed manufacturing, and experiment cutting-edge methods with which to challenge traditional sales channels. Such an advanced dimension is being supported by disruptive changes affecting people, spaces, technologies, consumption models and the role of the designer. Nowadays, the access to creative tools is becoming a social prerogative. An increasing number of productive activities, both individual and collective, are being created, fed by the proliferation of FabLabs, Maker Fairs, crowd-funding platforms such as Kickstarter, and market channels such as Etsy. The ideal scenario would be the development of local and interconnected productive ecosystems, sharing resources, tools, spaces and services to co-produce new design practices within integrated networks (involving new kinds of designers, producers and users).

5 THE DESIGNER'S PALETTE

According to Yee et al. [18] the designer should work in a more integrated, collaborative and systemic way and embody the following roles: facilitator, researcher, co-creator, communicator, strategist, capability builder, and entrepreneur. Design language, concepts and methods should evolve to strengthen working skills and mediate between different stakeholders. A new kind of collaboration between designers and businesses under the umbrella of new goals should foster a deep understanding of macro-economic, social and environmental drivers. Moreover, an entrepreneurial skill set must be nurtured, considering and challenging the constraints and potential of the current economic model, while exploring new ones that fit with sharing and circular economies. *Project Phoenix* is an example of user-centric and circular economy thinking from a MA Innovation Design Engineering graduate at the RCA. This labelling and manufacturing system addresses the disposal of small electrical and electronic products in the waste stream. At the end of life, small products can be easily broken into their components with electrical parts sliding automatically into a pre-disposed and labelled bag, ready to be posted back to the manufacturer. In every design project, viability must be considered, as well as scalability in different contexts and growth over time.

In order for new solutions and ideas to be embraced, they need to be explained and pitched in inspiring ways, using all the tools in the designer's palette to connect with the audience. Extensive mapping and visualization skills must be developed further to be able to fully comprehend and incorporate the wider systems implications of all design decisions and to formulate the right question within a brief. Finally, to implement innovation, designers must apply new tools and skills, such as data visualisation, product-service-system design, participatory design and customer experience prototyping.

6 THE POTENTIAL OF SERVICE DESIGN

Within this complex scenario, service design will likely be the key approach to facilitate the multidisciplinary and participatory process with diverse stakeholders aiming at developing

collaborative services [19] that are accessible, effective and replicable. Service design is here advocated as the systemic and user-centred process of “prosuming” (i.e. producing and consuming) services that are perishable and based on intangible (i.e. social and cultural) frames and tangible (i.e. technological) interactions [20] [21]. Service design, due to its ability to integrate user knowledge, manage complex situations through prototyping and conduct real public engagement, can support radical changes, increasing both competitiveness and sustainable performance. By designing service systems of people, information and technology, it is possible to co-create value while optimising the material consumption, as well as logistics, distribution, consumption and disposal and trigger social innovation [22]. The shift of interest from the realm of products to that of services and systems is well embraced and boosted by the new MA Service Design programme at the Royal College of Art. For example, Marion Ferrec and Kate Wakely’s *Disclosed* is a transparency certification and open data system to facilitate selective shopping by providing customised information, tailored around customers’ personal values, such as provenance, health, carbon footprint or ethical supply chain. Although product-service-system design has not proved to guarantee radically reduced environmental impacts yet [23], it has the potential to produce more sustainable outcomes than mere product design, if combined with localization [24], community engagement [25], lightness [26], and changes in consumer behaviour [27] [28]. By adopting service design methods (e.g. shadowing, storytelling, service blueprinting, etc.) it is possible to deeply understand (or empathise with) user needs and evaluate existing interactions or imagine future ones, for more durable product consumption patterns.

7 EXAMPLES OF BEST PRACTICE FROM SUSTAINRCA

In institutions where this transition is already taking place, disruptive innovation is occurring. At the Royal College of Art, where all programmes are 2-year masters level, a department, SustainRCA, has been set up to work with programmes to encourage all students address social and environmental challenges through their work. SustainRCA has helped embed sustainability as one of the core learning objectives across the college, providing support services to students from different backgrounds including arts, science, engineering and design. As a result, in the MA Innovation Design Engineering Programme, sustainability is now considered as a stimulator of creative innovation rather than a constraint and is used as a holistic criterion to assess each design decision. Self-initiated projects begin with a reflection on personal values and are tracked continuously by specialised tutors who provide advice and create connections with external experts. In another context, students are brought together in multidisciplinary groups and asked to find viable and innovative solutions to real-world problems with commercial clients, following a rigorous double-diamond process [29]. The questions are goal-focused, e.g. “*What is the future of mobility?*” “*How can residents of Camden Council take a more active role in creating a cleaner neighbourhood?*” or “*How can we produce meat at current production rates in a sustainable and ethical way?*” Such briefs require students to deeply research the given issue by broadening the emphasis of their design from products to include systems, stakeholders and the relationships between them, and generate briefs and ideas that are viable in the real world. Students explore new economic models and the potential of technology to scale up their innovative ideas within future scenarios based on digital fabrication and economies of scale, sharing and circular economy, happiness and wellbeing, to name but a few. After mapping and imagining future scenarios, students are encouraged to zoom in, exploring users and their journeys in order to define product and service needs of the system. Environmental impacts can be assessed through life cycle analysis tools such as Sustainable Minds (www.sustain-ableminds.com/software) or Eco-Indicator 99 (www.pre-sustainability.com/download/manuals/EI99_Manual.pdf). To develop and assess their concepts, students are asked to zoom out again to the real world and generate stories to explain their ideas. A palette of tools can support this complex task: for instance, the A420 Index is a mapping tool used to evaluate financial, social, personal and environmental sustainability of design concepts (www.a420.com/index.htm). While addressing systems and global challenges, students are also encouraged to use the C2C Innovator’s Toolbox (<http://c2ccertified.org>), the biomimicry strategies provided by the Ask Nature website (www.asknature.org). Students seek support and share their information and methods in platforms such as OpenIdeo (<https://openideo.com>) and O2 Global Network of Designers (www.o2.org). Finally, to deliver their designs, students are primed to explore interactions with different stakeholders as well as measure strengths and weaknesses of their outcomes in terms of environmental, social and economic sustainability. Throughout, students are supported by SustainRCA’s programme of tutorials, talks, workshops, resources and a wider network of specialists.

An important part of the process is to celebrate and disseminate the best examples of sustainability thinking across the College, raising students' profiles and connecting them with future potential employers and investors. For example, a far-reaching series of public-facing discussions about the creative responses to global issues, Sustain Talks, always invites a recent graduate with relevant work to open the event. Similarly, the Sustain Show & Awards showcases the brightest graduate projects from across the College, inspiring new intake of students with a broad mix of ideas for the future. The most successful ideas that emerge from this process are those that start with goal-focussed questions, provoking radical innovations that re-imagine lifestyles and behaviour in the future. As an example, *Ooho!* (Figure 3), a project by a group of RCA graduates, is an open source solution to a Do-It-Yourself packaging. By mimicking the way nature encapsulates liquids using membranes, *Ooho!* is an edible gelatinous structure made of brown algae and calcium chloride grown around a sphere of frozen water. In a cradle-to-cradle approach [30], the disposal of the membrane into the biosphere would provide a nutrient to the soil. This is a provocative concept that starts with the right question to the problem of bottled water. It asks not “*What material should a water bottle be made of?*” but “*How can we carry water with us on the move and have net-positive impact on the environment?*” While carrying a soft bubble of water in your pocket might not seem very practical, it is a short leap from here to the orange, described by Bruno Munari as nature's perfect way of carrying liquid [31].



Figure 2. Coral3 by Nell Bennett – Figure 3. Ooho! by Paslier, Couche and Garcia Gonzalez

8 CONCLUSION

This paper suggests that design education is at a critical point: strong growth in student awareness of social and environmental issues, a surge in development in the professional world and interest from new types of clients in the design process has meant that practice is outstripping the research capacity of the post-graduate education design community. Furthermore, there is a growing expectation for design to deliver successful outcomes in response to new challenges, for example from local and central government. Cross-disciplinary collaborations, building cutting-edge knowledge between design academia and the outside world must be encouraged, to re-frame a rigorous research agenda. Overall, there is a historic opportunity for design to lead on the evolution of new economic models that will shape a new ethics of sustainability from a bio-centric perspective, improving quality of our lives and that of the environment. This means moving beyond the anthropocentrism that has long characterised the vernacular of design education, focusing on the co-sustainment between diverse ecosystems. New design briefs must be set, that task students to take on broad sustainability issues, exploring them through visualization and mapping, and assessing the viability and scalability of their ideas according to sustainability criteria. Most of all, design educators need to be setting the right briefs to their students, ensuring they are primed to ask the right questions that push the boundaries of the vision for a sustainable future.

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