

Selected Readings of the 7th Information Design International Conference

1st edition

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Foreword

Information Design is a discipline that converges different areas, such as art, education and technology. This may be one of the reasons why the CIDI 2015 - 7th Information Design International Conference - attracted over 4000 people (among registered participants and general public) for the four days of the event held in Brasilia in September of 2015. This book brings together a selection of papers that illustrate some of the research topics discussed at the conference.

The Selected Readings book is composed of twelve chapters by three keynote speakers and the presenters at the conference. Papers that were originally published at the Proceedings of the 7th Information Design International Conference (Editora Blucher, 2015) were adapted for publication in this book. It is mainly intended to support an academic audience (e.g. lecturers, researchers, and graduate and postgraduate students). The chapters are gathered into three main themes: “Digital media design”, “Design education”, and “Methods, theories and new design approaches”.

The initial section concerns digital media design. Chapter 1, “Understanding animated and interactive journalistic health infographics”, by Rafael Andrade and Carla Spinillo, investigates the effects of animation, interaction and text display mode on understanding health infographics in online journalism vehicles. The empirical research observed five experimental conditions, involving 50 participants, and took into account both the graphics and informational aspects of the content. The second chapter of this section is entitled “Social interaction guidelines for Brazilian digital television: the example of “Tererês” TV program” and is authored by Taygoara Sousa and Paulo Souza. They investigate social interaction guidelines within the Brazilian model of TV and, as a result, they present a model of organizing and projecting design interfaces for digital TV. “Doulas, mothers, and cell phones: Storytelling and a supportive doula approach for mothers at risk for postpartum depression”, Chapter 3, by Judith Moldenhauer et al., explores the use of a cell phone app with a focus on storytelling. In particular, they investigate the use of a cell phone application developed in the USA for postpartum doulas to help mothers identify postpartum depression symptoms and how this app could be adapted for use in developing countries. Chapter 4, “Design and interactive bilingual literature”, by Rita Couto et al. concludes this first section; it describes the design process of an interactive book in bilingual digital format with a focus on deaf children. Their investigation encompasses relationships between Design, Education and Technology.

The chapters concerning design education were gathered together in Section 2. “Pictograms in teaching drawing to the visually impaired: a case study of a teenager’s drawing of a bird”, Chapter 5, by Mari Piekas, investigates teaching drawing to visually impaired children and teenagers. She proposes a method for teaching drawing from Pictographic vocabulary. “Collaborative learning process through co-creation of graphic representations for synthesis (GRS)”. Chapter 6, by Juliana Bueno and Stephanie Padovani, investigates learning in theoretical classes in Design post-graduation.

They present a study on the production process of GRS developed collaboratively by students during the classes of User-Centered Design in a Brazilian postgraduate course. Chapter 7, “Pioneering disciplines of History of Design in Brazil: the place of graphic design”, by the keynote speaker Marcos Braga, reviews the first disciplines that dealt with the history of design in undergraduate design courses in Brazil. He also shows an analysis of the place of the history of graphic design within these courses. The final chapter of this section, Chapter 8, is entitled “From Mapping to Data Visualisation: Re-evaluating Design Education at the Royal College of Art” and is authored by the keynote speaker Teal Triggs. She explores some of the key themes related to design education and its future, and how people are engaging with new ways of thinking about design education. She carried out these explorations through examples from MA and PhD students of the RCA’s School of Communication.

The last section is about methods, theories and new information design approaches. The first chapter of this section, Chapter 9, is entitled “Semiotics and information design. <metabolisme. design> an interactive tool for designers”, and is authored by the keynote speaker Bernard Darras. He presents a semiotic tool, called Metabolisme, which is “intended to accompany the follow-up of changing distributed meaning”. He also discusses the impact of information design on the development of this tool. Chapter 10, “Methods and practices of Brazilian designers on digital projects” by Paula Farias and Virginia Souto, investigates methods and practices of design processes in digital projects used by designers in Brazil. They present a study on design processes and methodologies, a survey with Brazilian designers of digital projects, and discuss design processes and methodologies used by them. “Basic ID-theories”, Chapter 11, by Rune Pettersson, presents seven theories applied to information design. The author classifies design into six families and presents many important information design definitions. He also explains that only one of the seven theories is considered internal (i.e. based on research within information design). The final chapter of this book is “Using new media art and multisensory design for information and data representation”, Chapter 12, and is authored by Patricia Search. She presents a study on multisensory design elements that augment traditional approaches to information design. Her chapter includes visual design examples from an interactive art project that illustrate “how new media design and multisensory information can create engaging experiences that expand our perception of multimedia and spatiotemporal relationships”.

We hope you have pleasant reading and can feel a bit of the experience of the 7th Information Design International Conference. Other papers from the conference are online available at <http://www.proceedings.blucher.com.br/article-list/cidi2015-255/list/#articles>.

Brasília, May 2016
The editors

Jury procedure for selecting the papers

The selection procedure for this publication was conducted by a jury composed of the editors of this book, with the mission of ensuring the quality of the publication.

The process started with the designation of the papers that gained the highest scores from the referees of the 7th Information Design International Conference. Then the editors who were to make the final choice of papers reviewed the material. As a result, 9 out of 132 papers approved for presentation at the conference were selected for this publication, together with those by three out of the four keynote speakers, Bernard Darras, Marcos Braga and Teal Triggs.

Editorial acknowledgments

We would like to express our thanks to the authors for their contributions, to the referees of the 7th Information Design International Conference, to the people who helped in the organization of the Conference and of this book, and also to the sponsors of the Conference, specially to The Brazilian Society of Information Design - SBDI, University of Brasilia - UnB, Coordination for the Improvement of Higher Education Personnel - CAPES, National Council for Scientific and Technological Development - CNPq and Research Support Foundation of the Federal District - FAP-DF. Special thanks to CNPq for sponsoring this book.

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Chapter 8

From Mapping to Data Visualisation: Re-evaluating Design Education at the Royal College of Art

Teal Triggs

keywords: information, experience design, data visualisation, pedagogy, design history, Royal College of Art

In 1967, the Experimental Cartography Unit (ECU) launched at the Royal College of Art and was funded by Britain's Natural Environment Research Council (NERC) with the main aim 'to advance art, science, technology, and practice of making maps by computers.' (Rhind 2008) The ECU was also tasked with working on new ways of communicating cartographic information. (Coppock 1968) Amongst the innovative approaches to emerge was a stereographic or anaglyph method for representing in three-dimensions statistical data on maps. Such advances in automated cartography techniques contributed significantly to the growing field of computer-assisted information visualisation. Nearly fifty years on, the connection between technology, science and design continues to be a central focus for RCA students and researchers. However, as shifts in technological, informational and socio-political environments take place, so too has the need to re-evaluate the role design education and research plays in addressing these new contexts. Using the ECU as a paradigm, this paper will explore how the art school context and its affiliation with science and industry continues to inform the development of design research and the curriculum. In particular, the ways in which students and researchers are transforming information into experiences through design. Examples will include student projects from MA Information Experience Design and the Creative Exchange Hub. The context for the ECU is, of course, historical but the challenges remain the same.

1 Introduction

In 1967, the Experimental Cartography Unit (ECU) launched at the Royal College of Art and was funded by the Natural Environment Research Council (NERC) with the main aim to 'advance art, science, technology, and practice of making maps by computers.' (Rhind 2008: 135). The ECU was also tasked with working on new ways of communicating cartographic information. (Coppock 1968) Amongst the innovative approaches to emerge from ECU's researchers was the development of a stereographic or anaglyph method for representing spatially statistical data on maps. Such advances in automated cartography techniques contributed significantly to the growing field of computer-assisted information visualisation.

Nearly fifty years on, links between technology, science and design continue to be a key focus for Royal College of Art (RCA) students and researchers alike. In particular, the ways in which students and researchers are 'transforming information into experiences through design.' As shifts in technological, informational and socio-political environments occur, so too has the need to re-

evaluate the role design and education plays in addressing these new contexts. This paper will outline the current pedagogical challenges faced by the School of Communication, RCA, and explore both relevant and forward thinking design curricula within an art school context.

The paper is divided into two parts. Firstly, I'd like to explore some of the key themes, which have emerged over the last few years in relationship to design education and its future. This includes taking a broader look of what the paradigm shifts might be and what impact this has on ways in which we develop curricula context and frameworks. This leads us to the second half of the paper. Here I will explore using specific examples from the RCA's School of Communication and its postgraduate offer, how we are engaging with new ways of thinking about design education, and within an art school context. We are grappling with new kinds of interdisciplinarity and multi-institutional collaborations – particularly with our affiliations with science and industry. Ways in which this in turn informs the development of design research and the curriculum will also be touched upon; specifically the ways in which students and researchers are transforming information into experiences through design. Examples will include student projects from our MA Information Experience Design programme as well as examples of PhD research undertaken as part of the Creative Exchange Hub – an AHRC funded collaboration between Lancaster University, Newcastle University and the Royal College of Art.

Earlier this year, I was invited to speak on the subject of design education for a conference sponsored by the University of Ljubljana in Slovenia, held on the occasion of the Academy of Arts and Design's 30th anniversary. This prompted the organizers, designers Petra Oven and Barbara Predan, to use the event as an opportunity to create a forum to evaluate where design had been situated historically (particularly within their own academy), and to propose a new model for design education for the future. Drawing upon the work of the French philosopher Jacques Rancière, a 'model of emancipation' was introduced where 'the educational process must transcend the mere transfer of knowledge.' (Oven and Predan 2015: 12) In order to make this manifest, Oven and Predan, like Rancière before them, ask three key questions: 'What do you see? What do you think about it? What do you make of it?'¹

My answers were as follows:

Q. What do you see?

A. Things around us are changing. Different kinds of demands are being made on designers. The communication design profession itself is moving from designing artefacts to designing tools, systems and experiences. Industry is now seeking editors, curators and visualisers of digital information.

Q. What do you think about it?

A. It is clear that we need to review where we are. With this shift new pedagogical challenges have emerged in order to ensure the relevancy of current design curricula within a context of social, political, economic and cultural transformation.

Q. What do you make of it?

A. We have reached a pivotal point in the history of design education. I would argue that in education as well as the profession there isn't one single way to teach ways of thinking and making. We remain eager to hang on to the principles of basic design; our foundation courses still teach core skills and aesthetics. At the same time, we must embrace a space where new technologies are

¹ The one-day conference 'Design Education: What do you see? What do you think about it? What do you make of it?' was organized by Petra Cerne Oven and Barbara Predan in 2015, celebrating 30 years of the Academy of Fine Arts and Design at the University. In their introduction, Oven and Predan acknowledge the work of Jacques Rancière and his predecessor Jean-Joseph Jacotot who both question the means by which knowledge is transferred in education.

transforming how we think as designers which calls for an advancement of new skills and processes (e.g. coding and programming, interdisciplinarity and social science methods) in order to address the complexities offered by contemporary and future challenges and contexts. The boundaries of our profession in communication and information design have necessarily blurred as the challenges become more complex, the means of production alter, and the users/audiences become more sophisticated in their expectations.

Oven and Predan's three questions provoked both speakers and the delegates to reconsider their current positions with regard to design education and those 'tools that have been proven over time to facilitate the delivery and acquisition of knowledge.' (Oven and Predan 2015: 8) Within this context of new complex problems, Oven and Predan argue for a 'radical transformation' in design education. That is, a move beyond the continual cycle of changes that take place in education, and toward a rethinking of 'the very framework of traditional educational methods'. (Oven and Predan 2015: 10) This means a significant pedagogical shift from relying on a 'classical model' of passive learning, to a more engaged or active model where students are 'enabled' in their independent learning. (Oven and Predan 2015: 12) Such an 'emancipation' occurs where 'students are able to decide whether they will acquire knowledge when they choose to...' (Oven and Predan 2015: 14) This would most certainly require a framework for learning that supports students in moving toward their own means and methods for independent learning,

This proposal also presumes that students recognize the need to become willing participants in this new kind of acquisition of knowledge. This implies students will look to being more flexible in their learning and critically engaging in processes of production, research, experimentation, testing, prototyping, and so forth, in order to increase their depth and breadth of knowledge as independent learners. Whether the reader fully agrees with this model or not, it was apparent that the debates which followed the conference presentations showed that many of the delegates were experiencing similar concerns about the development of infrastructures and curricula within own institutions.

2 Context of UK Education

The RCA has not been immune to external pressures. Economically as well as technologically, paradigm shifts in industry and the profession have triggered a re-evaluation of traditional methods, practices, techniques and user/audience expectations. This has an impact on course development, both in terms of exploring the range of new offers, but also refreshing or updating current programmes. In addition the role of design research is increasingly key to strategic plans that support the development of intellectual and research in terms of design and innovation. The importance currently placed on collaboration and partnerships, nationally and internationally, institutionally and with industry, by the Research Councils UK is significant. Funding opportunities are now premised on the bringing together of interdisciplinary and multi-institutional research teams, which is shaping new forms of discipline collaborations. This runs across doctoral training, start-up businesses, as well as knowledge exchange and public engagement. The Research Council UK's 'Framework of Principles' states that for UK funding bodies:

'Complex interdisciplinary research projects increasingly need to be tackled through multi-institutional proposals which bring together the necessary expertise to address challenging research problems.' (Research Council UK 2015)

Whilst this may force our hands for funding to work across disciplines, for communication and information design, this seems entirely the right direction to be going in. At least research, which crosses different disciplines, may now be adequately supported through funded projects. This in itself is a shift in

government policy, which has been beneficial to communication/information design researchers.²

Back in the classroom, however, in the UK, the recent election of an all-Tory government has meant further entrenchment of conservative views on education policies and in its election manifesto laid out additional funding cuts. The broader economic environment, in which education is situated, has resulted in the implementation of ‘austerity’ measures by the UK government. For example, calls for a 33% cut up to 2018-19, for non-protected government departments. The impact on education has already proven financially significant, with further job losses, consolidation of institutional resources, increased tuition fees, and so forth. The new Immigration Act has also placed additional stresses on the ability of universities to recruit and maintain overseas students – including restrictions on student visas. In her piece ‘What a Tory Government Means for Universities’ for *The Times Higher Education*, Nicola Dandridge, argues that education must make a powerful case to Cameron and his Cabinet which ensures ‘investment in skills and our world-leading research – on which much of the UK’s long-term growth potential depends – [and] to enable the sector to contribute even more to the economy and society.’ (Dandridge 2015) This too, has been a catalyst for radical change.

3 Views on Design: Norman and Friedman

Rethinking design education is very much on the agendas of design writer Don Norman – who writes a regular column on design for *Core77*, and Ken Friedman, who researches at the intersection of design, art and management. Norman and Friedman have raised concerns about education in relationship to the shifting paradigms of design in an increasingly global economy. Whilst they both refer primarily to the field of industrial and product design, it is nonetheless worth assessing their positions in relationship to communication and information design.

As communication and information design have broadened in scope, dealing with greater complexity of issues or ‘wicked problems’, this suggests a greater need for revising our curricula in order to provide a greater ‘depth of knowledge’. Norman argues that students have little or no understanding of ‘statistics and behavioural variability,’ ‘unconscious biases,’ or the ‘necessity of control groups.’ (Norman 2010: 3) He calls for a greater awareness of the interrelatedness of the ‘behavioural science, technology and business’ and calls for ‘training in science, scientific method, and experimental design.’ (Norman 2010: 1)

Friedman summarizes both his and Norman’s positions in the paper ‘Models of Design: Envisioning a Future Design Education’ for *Visible Language* (2012). Friedman observes:

‘Design is an interdisciplinary profession serving multiple needs. Designers work in transdisciplinary teams whose nature and constituency changes according to the project at hand. For this reason, it is difficult to argue for a definitive range of skills or even a specific series of knowledge domains. In educational terms, these change depending on the location and focus of the program and curriculum. Even so, it is possible to suggest a typical taxonomy of domains that one might expect to see in a strong, contemporary design school.’ (Friedman 2012: 143)

Friedman goes on to propose that design education is experiencing a shift from craft-led approaches to designers developing strategic tools (e.g. ‘models, simulations, decision theory and systems thinking’ [Friedman 2012: 148]). Meanwhile Norman advocates for the teaching of behavioural and social sciences as design moves increasingly toward services, interaction and experience. It is worth

2 In January 2014, the UK Higher Education Academy issued a commissioned report on ‘Flexible Pedagogies: technology-enhanced learning’ which proposed e-learning as providing new markets for part time learners, accumulation of credits toward ‘...the prospect of lifelong learning in a scalable way.’ (Gordon 2014: 2)

noting that Norman still believes that the design profession will always need designers trained in materials and production as well as styling. (Norman 2010: 5)

The change that Friedman and Norman are proposing is already taking place in many institutions. However, college staff, in particular, has expressed a need to update their own knowledge bases. Norman is critical. He comments: 'The uninformed are training the uninformed.' (Norman 2010:3) Within existing academic structures, catering for staff to develop more experimental, behavioural or social science methods may not be so easy to integrate. On undergraduate courses in the UK, for example, it is common for staff to find themselves already stretched with existing government requirements for delivering core curricula and vocational skills, let alone teaching behavioural and social science methods. If something new is incorporated into the curriculum, then the first thing staff will ask is 'what gets left out of my teaching?'

Perhaps we need to consider alternative ways of taking into account what the future of our curricula might be, by asking what they are intended to deliver: to whom, for whom and by whom?

4 Design and 'Pedagogical Flexibility'

Norman and Friedman call for more of an alignment with engineering and science, but they also caution that educators must not discount what is good about what and how they currently teach. Norman remarks: 'the artistic side of design is critical: to provide objects, interactions and services that delight as well as inform, that are joyful.' (Norman 2010: 6) For me, this is where the art school context just might come into its' own. How might we employ what the art school context might provide in terms of an ethos, core skills and a philosophical position as we move toward innovation?

Neville Brody, designer and Dean of the School of Communication RCA, has argued on many occasions for designers to be more agile. And he refers to education as the basis for fostering 'skilled dangerous minds.' That unique approach of being 'radical' or 'disruptive' is particularly valuable in the conceptual phase of the design process where 'thinking outside the box' is a necessity. (Simpson 2013) At the same time, design is an applied profession. There is a context, a client brief and users to take into consideration. However, I agree there is room for exploration, experimentation and thinking differently when the brief requires new and visionary ways of thinking, including criticality and an understanding of material and digital processes. Designers today certainly cannot be complacent.

In June 2014, Ronald Barnett delivered a report 'Conditions of Flexibility' for The Higher Education Academy in the UK, where he called 'for serious attention to be paid to radical, imaginative educational innovation and experiment in order that HE providers do justice to the faith their students put in them in preparing them for living and working in such a world and for shaping its future.' (Barnett 2014: 4) Barnett distinguishes flexibility in how it is applied to both 'systems flexibility' and 'pedagogical flexibility'. This might mean a review of systems to be more flexible in delivery models, including e-learning or part-time study as well as lifelong learning post degree.³ On the other hand, 'pedagogical flexibility' responds more clearly to 'human beings who are themselves flexible, able to respond purposively to new situations and ideas.' (Barnett 2014: 9).

Barnett's report also expands into the 'emerging forms of flexibility in relation to research processes which he calls 'epistemic flexibility' reflecting the ways in which knowledge has a more fluid character. This brings us back to Oven and Predan's observation on the ways in which knowledge and knowledge production is changing. Barnett offers a direction for thinking about knowledge in this new global context:

³ This is echoed in the Design Council's White Paper 'Design for Innovation: Facts, Figures, and Practical Plans for Growth'.

‘Not only is flexibility a matter of the ways in which disciplines might open themselves to each other (in transdisciplinarity; in pluridisciplinarity) and of the ways in which researchers are expected to work (in transnational teams, in new forms of ‘publication’) but it is a matter evident at different levels of knowledge production.’ (Barnett 2014: 26).⁴

Barnett’s report outlines the ways in which research is positively feeding into the curricula of undergraduate programmes, and the contribution research is making to underpin learning of methods and approaches. At the same time, the reciprocal relationship between teaching and research is coming under scrutiny within the academy. Staff increasingly, have been designated as either ‘research active’ or ‘non-research active’, as universities push toward increased funding from industry-based projects and consultancy. Research is increasingly collaborative, operating in academic-industry partnerships, even expanding into international domains; and, financially this is of benefit to institutions increasingly as they are asked to locate third-stream funding opportunities.

Barnett’s 88-page report is a rich resource in the way it highlights and puts into a contemporary pedagogical context many of the challenges we are currently facing in the teaching of design. The solution to the diversity of goals – student, staff, institution, industry, and government – may remain in understanding differing definitions of ‘flexibility’ within and amongst other contexts: markets, student expectations, employability, and discipline-based value systems. (Barnett 2014: 35-39). Barnett refers to flexibility as a ‘trope’ ‘...for imagining and then realising new potential that may be glimpsed for the student as *person-in-the-making*.’ (Barnett 2014: 73) A laudable goal, which I am sure as educators, we all share.

5 Educating ‘Flexible’ Designers: Royal College of Art

I would now like to turn to the learning undertaken by students at the Royal College of Art. By way of an introduction, the College recently celebrated 175 years since its inception in 1837 as the Government School of Design, whose goal was to ‘improve the education of designers, which, it was assumed, would in turn improve the output of British industry.’ (Oshinsky 2006) In 1948 the School of Graphic Design was founded, led by Professor Richard Guyatt, with the sole intent to ‘reimagine education for the 20th century’. The emerging post-war context led Guyatt to an approach, which brought together the ‘relationship between the fine arts, the applied arts and crafts,’ as a way of articulating his views on the nascent profession of ‘commercial art.’ This way of thinking he positioned as: ‘Head, Heart and Hand’; which continues to inform the core values fostered by the School of Communication’s learning and teaching approach (Triggs 2015: 94).

In 1967, the RCA was granted a Royal Charter with university status and still today remains the world’s only wholly postgraduate institution of art and design. I mention this as our history still frames the way we approach learning and teaching at the College, but also the research and innovation links we maintain with industry. Throughout the College’s history, collaboration has featured amongst the students who seamlessly move across programmes, working with others who may bring knowledge from different disciplines or professional backgrounds as relevant, to their projects. Equally, the connection between technology, science and design continues to be a central focus for RCA students and researchers. As shifts in technological, informational and socio-political environments take place, so too has the need to re-evaluate the role design education and research plays in addressing these new contexts.

The second part of this paper will draw from early examples of the Experimental Cartography

⁴ Ronald Barnett goes on to mention what is meant by the idea of the student as ‘global citizens’ – a concept which has long been considered by design educators such as Jan van Toorn and Jorge Frascara, for example.

Unit (ECU) in the 1960s and then bring this approach up to 2015 with work by students from the Information Experience Design (IED) programme and PhD candidates on the Creative Exchange hub, whose research intentionally draws upon collaborations with industry and academia in order to explore new forms of design innovation.

6 Experimental Cartography Unit (ECU)

In 1967, the Experimental Cartography Unit (ECU) launched at the Royal College of Art and was funded by Britain's Natural Environment Research Council (NERC) with the main aim 'to advance art, science, technology, and practice of making maps by computers.' (Rhind 2008) The Unit was also tasked with working on new ways of communicating cartographic information. (Coppock 1968) Amongst the innovative approaches to emerge was a stereographic or anaglyph method for representing in three-dimensions statistical data on maps. This included the use of red-green glasses to introduce a 3-D effect to the spatiality of the maps.

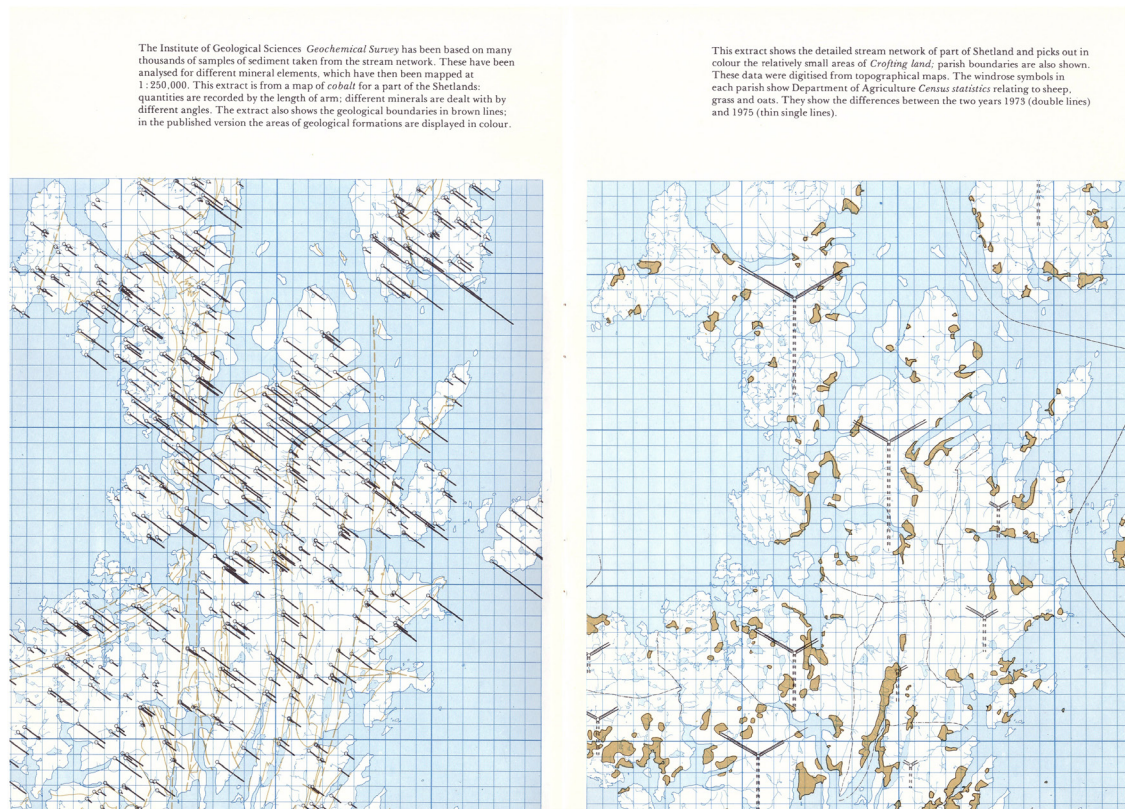
Such advances in automated cartography techniques contributed significantly to the growing field of computer-assisted information visualisation. The role the RCA played came about as its first Director, David Bickmore, saw the potential for designers to develop new graphic conventions in order to 'convey information meaningfully'. (Margerison 1976: 4) Tom Margerison, who later became founding Editor of the magazine *New Scientist*, wrote an essay 'Computers and the renaissance of cartography' for an RCA-published booklet. Margerison observed that: 'a map is the simplest, most elegant and informative way of presenting data which vary across a surface.' (Margerison 1976: 3) He proposed that maps were 'pictorial' and that they provide both quantitative and qualitative information. ECU was founded in response to recognizing the limitations of two-dimensional maps for representing specialised information. The Unit was able to digitise data sets in order to 'replay and plot them with the required accuracy', thereby allowing cartographers the flexibility to 'draft the parts of the map [they are] interested in.' (Margerison 1976: 6)⁵

Whilst I am not a specialist in computer or cartographic history, the examples of maps produced using this process illustrate a range of possible uses of data sets and methods of visualisation. It is not the purpose of this paper to go into any depth into digitisation, but to use these examples as evidence of the intent of the collaboration, which Bickmore had envisaged between computer scientists and graphic designers in the production of these maps.

In this example we see an abstract from the *Atlas of Global Seismology: 1909-1969*. The visualisation was generated using a 'large digital data bank of seismic records held by the Institute of Geological Science.' The caption reads: 'The seismic information for each 'square' is plotted directly by computer in bars of different thickness, orientated N-S; E-W and diagonally. A brown tint shows areas in which some activity has been recorded during the total period. – e.g. on maps of other time periods.' (Margerison 1976: 11). Other maps in the booklet included visualisations of Vegetation Boundaries in the Shetlands – 'compiled using air photographs and the vegetation categories arrived at from their survey'; Ecological Habitat in the Shetlands, based on analysis of the Unit's own field work; contours of the eastern Atlantic from the Institute of Oceanographic Sciences; details of an Experimental Geological Map of London reflecting geological patterns; and Land Use Mapping with local authorities, in which 'the locations and the rateable values of all commercial properties in central Winchester' were illustrated. The ECU existed until the late 1980s and was the forerunner to the ways in which scientists and designers have been involved in scientific collaborations external to the College.

5 Other accounts of the processes developed by ECU provided alternative discussions of the work undertaken by the Unit's scientists. See for example, Coppock and Rhind (1991).

Figure 1. Mapping of cobalt quantities (left) and detail of stream network (right) in the *Shetlands from the Atlas of Global Seismology: 1909-1969* reprinted in T.A. Margerison (1976) *Computers and the Renaissance of Cartography*. London: Experimental Cartography Unit, Royal College of Art: 10-11. © Royal College of Art, reproduced with permission.



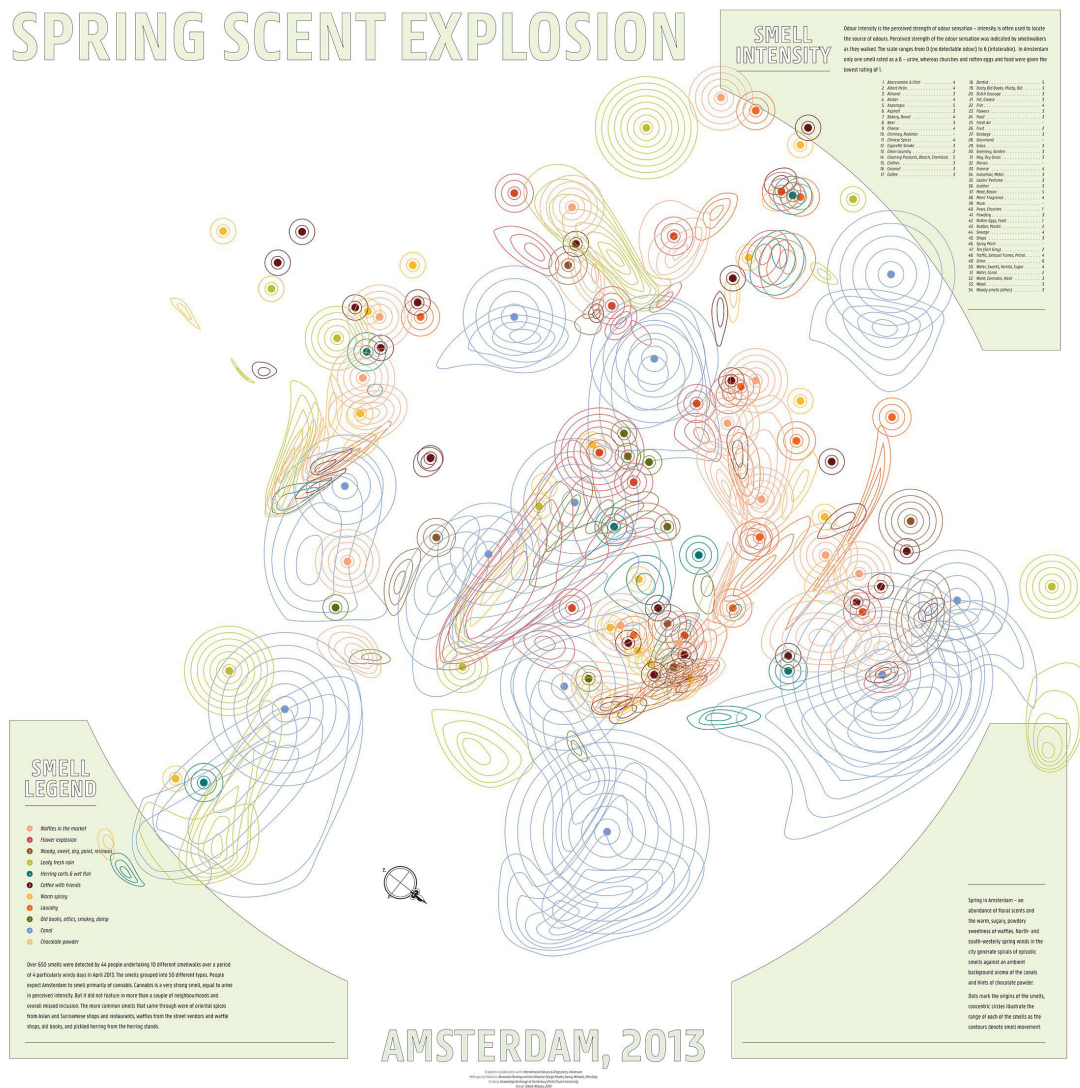
7 RCA Researchers

I'd now like to look at a few examples of work undertaken more recently by PhD students and also students from the MA Information Experience Design programme, which started in 2012. These examples of research processes and outcomes reflect the ways in which designers at the RCA have joined in partnerships with industry, with researchers from other disciplines or from across the RCA in different departments. I will provide brief descriptions of the project work by way of an introduction to the kinds of research students at the RCA are involved. Most of the students whose work I will show here have websites, which I would encourage you to visit for more detail. I won't be able to give the work the detailed discussion that it deserves during this presentation. However, through the visual clues on the screen, what I hope emerges is an indicator of the kinds of research practices that are being undertaken, and their applications.

As we began with maps from the Experimental Cartography Unit, I'd like to continue by showing you more contemporary versions of cartographic research. This first example is from Kate McLean, a PhD candidate whose research has focused on human perception of urban 'smellscapes'. McLean has created smellmaps from Brooklyn to Edinburgh, and has recently been working with Fifth Sense, a UK charity for those suffering from anosmia (the inability to smell), to create and facilitate meaningful conversations through shared smell experiences, between normosmics and anosmics, using 'smellwalks' and watercolour paintings of imagined and recalled smells. In an earlier example, she has visualised the results of a study undertaken with 44 participants on ten 'smellwalks' through the city of Amsterdam.

Smellmaps capture the smells as recognised by the participants as they go on a guided, walk through a city. The research walk was collaboration with industry partner Bernardo Fleming of International Flavours and Fragrances. The resulting smellmap depicts 650 smells detected by 44 people undertaking 10 smellwalks over a period of four days in April 2013. Over 50 categories of smells were identified, based on the written descriptions of the smellwalkers, including ‘an abundance of the ‘warm sugary powdery sweetness of waffles’, oriental spices, pickled herring, and old books. (McLean 2014: 144) Additional data comes from a range of observations of the designated urban space including colour, movement, range, and evaporation. The dots are the original sources, the concentric circles indicate range of the smell sources and, movement is recorded from local wind direction at the time of data collection. (McLean 2014: 145) Once the data is translated into two-dimensional maps, McLean then creates an animated visualisation – these are at once informational and magical in providing a sensorial experience of the city.

Figure 2. *Spring Scent Explosion*, Amsterdam (2013) is a visualisation of a smellmap designed by Kate McLean as part of her PhD research at the Royal College of Art. Image courtesy of Kate McLean.



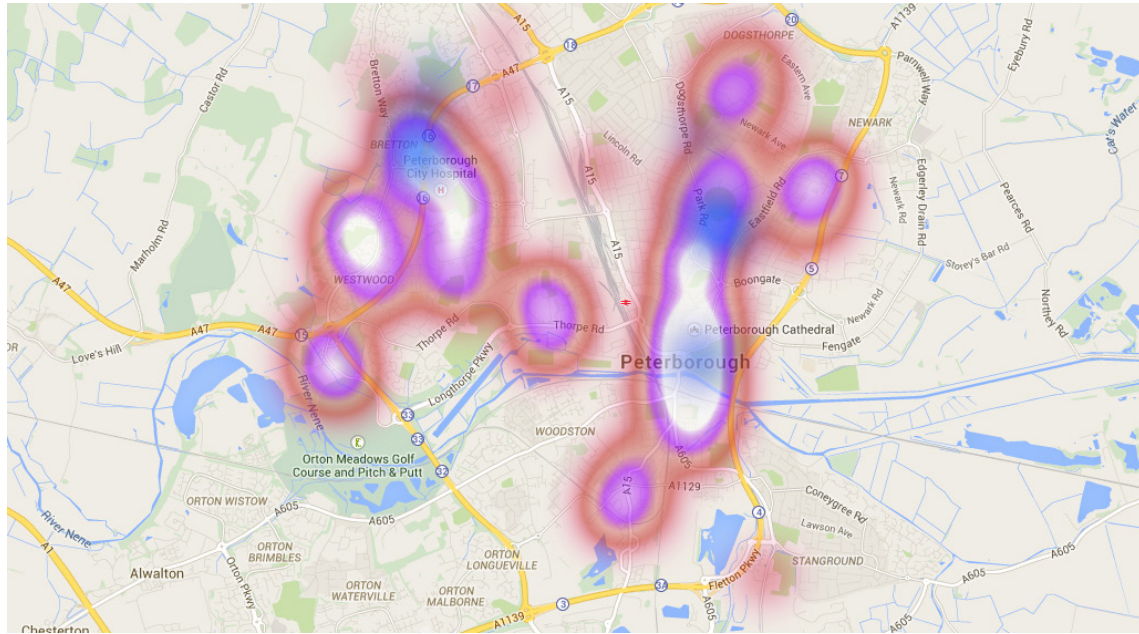
My next example of PhD work emanates from what we are calling the Creative Exchange Hub (CX). The emphasis that government agencies and funding bodies are placing on strategic collaborations with industry partnerships is evident in an Arts and Humanities Research Council-supported initiative. CX is a four-year knowledge exchange hub for the creative economy led by Professor Rachel Cooper at Lancaster University along with co-investigators from Newcastle University and the Royal College of Art.⁶ This inter-institutional project draws on complementary specialist research expertise under the umbrella of digital public space – a term which has prompted debate as to its exact definition. The three partner institutions have agreed that ‘digital public space’ is focused on making accessible ‘previously inaccessible and private data’. (Myerson 2015) This means exploring new and innovative ways in which the public might engage with digital spaces, and to follow on considering what the policy implications might be.

A key aim of the Creative Exchange Hub is to develop a community of individuals skilled in design research and knowledge exchange. One way in which this is being achieved is through the development of a cohort of 21 PhD students undertaking practice-led/based doctoral training in the fields of design. The CX PhD model positions the student at the centre of the knowledge exchange process emphasising the development of expertise in generating ideas, engendering exchange, managing cross-sector relationships and developing collaborative design-based research. CX PhD students work with a variety of academic and non-academic partners in the course of their studies and through short-term projects, developing knowledge and skills in their individual specialisms while simultaneously bringing new insights to the social, commercial and cultural organisations they collaborate with. Not only is new knowledge being generated through partnerships (research *through* knowledge exchange), but also a new model for the design PhD is explored. (Dalton, Jacobs, Simmons, Triggs 2014)

Whilst time does not permit showing the work of all the PhD students involved in the CX Hub, I’d like to briefly describe two different ways in which students at the RCA in particular, are working with industry and other academics to foster innovation in the creative industries. In each example, these students bring to a series of collaborative industry and academic projects different understandings of ‘digital public space’, each equally valid, and each focusing on different forms of public engagement. The first example is a project from Jimmy Tidey, a web developer by training and a member of the technology community. Tidey has worked extensively with local governments and applies his experience to using ‘physical representations of digital information to increase social cohesion within communities.’ (Tidey n.d.) In particular, Tidey has partnered with the Department for Communities and Local Government, the Royal Society of Arts Manufactures and Commerce (RSA) and software development company TableFlip. Tidey is working with organisations that have a public facing remit in order to test and expand the functionality of LocalNets – ‘an innovative social media digital analytics tool created to drive community action and promote the take-up of community rights.’ (Tidey n.d.) Tidey has been using the LocalNets app to stage a series of interventions intended to improve low take-up for community rights in the Bretton Parish of Peterborough, UK. Participants for the Bretton Buzz project’s community meeting were discovered and invited through his social media analysis. The resulting visualisations using ‘community asset discovery’ have yet to be completed. However, the potential exists for these to be returned to community spaces in physical form in order to help ‘understand community concerns and issues more efficiently’. (Tidey n.d.)

⁶ Professor Rachel Cooper, OBE at Lancaster University is Principal Investigator and Director of the Creative Exchange Hub. Professors Neville Brody and Jeremy Myerson, based at the Royal College of Art, are two of the Hubs nine co-investigators. Full details of all three universities and the 21 CX PhD researchers and their projects, are available online: <http://www.thecreativexchange.org/>

Figure 3. Visualisation of findings from the digital analytics tool LocalNets developed by Creative Exchange PhD researcher, Jimmy Tidey, at the Royal College of Art. Image courtesy of Jimmy Tidey.



The PhD research of architectural designer Benjamin Koslowski is an example of how innovative solutions in the area of health and wellbeing emerge out of collaborative partnerships. In this case, Koslowski partnered with the Foundation for Art and Creative Technology, or FACT Liverpool, to research and design a series of projects contributing to the 2015 exhibition ‘Group Therapy’. The exhibition explored, with works ranging from art installations to documentary interviews, ‘mental distress in a digital age’ and highlighted the relationship between mental wellbeing and technology. His involvement in this project informed his own PhD research into paradigms around privacy and the public; actor and audience, and the spatial relationships between the digital and physical.’ (Koslowski 2015)

In this particular project titled ‘States of Mind’, Koslowski’s collaboration was extended to include an interactive platform designed with Brendan Dawes and Claire Cook of Nexus Productions Interactive Arts team, a London-based company which explores storytelling and design to create interactive experiences; and, academic partners Roberto Botazzi from the School of Architecture, RCA and Karen Ingham from the University of Wales, Trinity Saint David.

A console in the exhibition asked visitors to respond to the question: ‘What does your mental health look like right now?’ Through manipulating a series of knobs and dials, the user is able to generate a digital object, which becomes an abstract representation of their state-of-mind. An image is generated which is externalised onto a large screen publicly displayed in the foyer of the gallery – thus making public what is essentially a private emotion. The project harnessed Koslowski’s ability to test the effectiveness of the visualisation of intangible notions, such as wellbeing and its private positioning, transformed into a publicly shared version using a vocabulary of abstracted rhizomes. Such visualisations could be expanded in order to map the ‘emotional landscape of the city’ through the ‘gathering of narrative experiences.’ (Koslowski 2015)

The work of our PhD students is not limited to involvement in the Creative Exchange Hub but also reflect shared research interests around data visualisation, narrative and knowledge exchange and collaboration. Here we might return to the idea of ‘pedagogical flexibility’, which enables platforms for ‘radical, imaginative educational innovation and experiment.’ (Barnett 2014: 4) In part, we believe this can be supported through the exchange of research knowledge between our PhD and MA students.

Figure 4. 'States of Mind' (2015) was a collaboration between Brendan Dawes, Claire Cook, Roberto Botazzi, and Karen Ingham led by Creative Exchange PhD researcher Benjamin Koslowski, at the Royal College of Art. Image courtesy of Benjamin Koslowski. Photo: Brendan Dawes.



8 Data Manifestation Workshops

Communication, and the methods by which we facilitate or mediate this act of conveying information, is by necessity undergoing changes in the design of processes, methods and modes of dissemination used to convey complex information. In a forthcoming paper 'Data Manifestation: A Case Study', Karin von Ompteda, who is a PhD candidate in Visual Communication with a background in Biology⁷, describes the learning experience students from across the RCA have experienced on an annual week-long workshop she has run since 2010 on 'data manifestation'. Von Ompteda defines data manifestation as 'a design practice involving the communication of data through objects, installations and experiences, with the purpose of stimulating dialogue on important and timely topics.' (von Ompteda 2016) In this way, the students are liberated from what are now seen as conventional approaches to data visualisation (for example, the nevertheless excellent work of statistician and artist, Edward Tufte; and David McCandless who refers to himself as a data journalist)⁸.

Students in von Ompteda's workshops come from a range of different MA programmes in the College, which means the knowledge of disciplinary practices from Product, Information Experience Design, Visual Communication, Architecture, and so forth, combine to generate effective, if not innovative, solutions to workshop briefs. With the students involved, the representation of data was no longer confined to two-dimensional solutions but naturally broadens out. Von Ompteda's brief asks students to 'to translate the data into an object, installation or experience that stimulates dialogue and has the potential to shift peoples views on an important of timely topic – a practice which is visual, physical and experiential.' (von Ompteda 2016) This opens up the ways in which experimentation; interpretation, curation and the ethical implications of working with online open-access datasets (in this case data from the World DataBank and the World Values Survey) might be handled. Equally as important, the brief asks students to explore and test through different means the ways in which selected data could manifest itself to a broader public audience.

7 Karin von Ompteda has recently joined as an Associate Professor the Faculty at Ontario College of Art and Design, Toronto where she is teaching similar approaches to data manifestation to undergraduate students.

8 Edward Tufte is perhaps best known for his series of books on information design including, *Envisioning Information* and *The Visual Display of Quantitative Information* (Graphics Press). David McCandless' book *Information is Beautiful* (Harper Collins) and his infographics for *The Guardian* newspaper brought data visualisations to a broader public consciousness.

Nurturing the relationship between communication design and fine art practices facilitates the way in which more abstract or conceptual ideas might provide a ‘hook’ for the interpretation of data. Students, in cross-disciplinary groups, were asked to take an authorial position on their selected datasets, which included complex issues concerning the environment, gender, race, religion, politics, and so forth. (von Ompteda 2016) Von Ompteda, in a description of the workshops, acknowledges the subjectivity of this project, but argues for its emphasis as:

‘...a way for students to take ownership through their specialist areas of interest and to explore the ways in which data might entice a conversation with its viewer. These projects are introductions to the subject and critically engaging with process and interpretation through data visualization...’ (von Ompteda 2016)

This brings us back to Rancière and his ‘model of emancipation’ where we might be asking questions which expand the otherwise limiting boundaries of design practice: ‘What do you see? What do you think about it? What do you make of it?’

Von Ompteda’s knowledge as a research degrees student in design and her training as a scientist informed her project framework through which these MA design students have engaged in learning. I would also argue that this approach is informed by an art school context; where models of learning already foster collaboration, experimentation, and interdisciplinarity. These contexts and juxtapositions for approaching data and its exploration have resulted in thought-provoking outcomes. By critically engaging with data, von Ompteda’s intent is to also introduce students to the potential problems surrounding data if accepted at face value.

One example in which the multiple ways in which data is questioned and communicated is exemplified in *My Life Don’t Mean A Thing If It Ain’t Got That Swing* - a collaborative project between Polly O’Flynn (Visual Communication); James Pockson (Architecture), and Peter Shenai (Information Experience Design). In this project von Ompteda asked students to take as their starting point data from the World Value Surveys Association (2015).

Figure 5. *My Life Don’t Mean A Thing If It Ain’t Got That Swing* (2015) was a collaborative project between Polly O’Flynn, James Pockson, and Peter Shenai for a workshop led by tutor Karin von Ompteda. © Royal College of Art. Photo: Dominic Tschudin.



The question asked of participants of the survey was: ‘All things considered, how satisfied are you with your life as a whole these days?’ (World Values Survey Association, 2015). Von Ompteda describes this project in some depth in her paper, as an example of the way in which students had reconsidered the data relationships to what happens when you ‘see’ information and then, what happens where information is ‘experienced’. The resulting outcome was the construction of a life-sized swing set, which eagerly invited viewers not only to engage with statistical data, which was visualized on the set’s frame, but also through the act of swinging where ropes were adjusted in relation to the percentage of satisfaction. (von Ompteda 2016) Whilst many of the solutions to von Ompteda’s brief may not be seen as viable in the short term as ‘real world’ applications, the learning undertaken through the act of collaborating, making, research and experimentation has given students the confidence to undertake data visualisation projects into more applied contexts in the future. At the same time, the exposure to new multimodal forms to communication may ideally one day be integrated fully into the information landscape.

9 MA Information Experience Design (IED)

Students on MA Information Experience Design (IED) under the programme head Dr. Kevin Walker, provide my final set of examples. Walker explains that ‘IED is about transforming information into experiences’ which is achieved through research and experimental practices. Such explorations are made manifest through for example, through data visualization, installations and investigative design. (RCA 2015) The programme launched in 2012 and had its first graduating class in 2014.

Pivotal to this programme is the way it has embraced the shifting paradigms of the broader questions around the call for learning associated with design, social and behaviour. Walker, whose own background is in social science and journalism, places an emphasis on research methods in which students engage with interdisciplinary and participatory processes, explore behavioural and socio-cultural contexts, and develop their skills in decision-making and critical thinking. The curriculum encourages students to engage critically in making and hacking through a range of materials, exploring data visualisation, installations and exhibitions and experience design, using both physical and digital tools and materials (Information Experience Design 2012). Here we come back to Professor Guyatt’s intersection of art, craft and applied contexts – ‘with the fine artist learning from his heart, the designer learning from his head, and the craftsman learning from his hand.’ (Guyatt 1976, 3)

Students from across the RCA in Innovation Design Engineering, Information Experience Design and Design Products explored the notions of data transparency in their project *Birth of the Digital Egg*. The project was an outcome of one of von Ompteda’s ‘data manifestation’ workshops where students were asked to ‘explore global statistics to tell their stories’. (von Ompteda 2014) In this case, students asked, ‘As we increasingly connect virtually, are we gradually disconnecting from reality?’. The use of the egg as a metaphor became the starting point for their exploration into representing data based on ‘the inverse relationship between birth rates and Internet usage in various countries.’ (Walker 2014) The final result was the creation of a series of exquisitely crafted opaque and translucent eggs designed to convey their makers’ position on the ‘hollowness of light-speed digital communication’ and ‘the solidity and natural form of organic life’⁹.

9 MA students at the RCA who collaborated on the ‘Digital Egg’ project were: Sungwhoon Cho (Innovation Design Engineering), Thomas Essl (Innovation Design Engineering), Carrolynn Hsieh (Information Experience Design), Jae Kyung Kim (Information Experience Design), Kevin Smeeing (Design Products).

The combination of craft, technology, and critical thinking is an approach that forms the basis of much of the work produced by students in the programme. At the same time collaboration is often essential for the realization of the works. For example, the piece titled *Change Ringing* (2014) was a successful collaboration between IED student Peter Shenai and composer Laurence Osborn. Each brought relevant skill sets to the realization of their intent, which was to craft and document the shapes and sounds derived from climate change data. A series of cast bronze bells representing climate data in various decades of the 20th Century then formed the basis for a large orchestral composition.

Figure 6. *Birth of the Digital Egg* (2015) was a collaborative project between Sungwhoon Cho, Thomas Essl, Carrolynne Hsieh, Jae Kyung Kim, and Kevin Smeeing for a data manifestation workshop led by tutor Karin von Ompteda. © Royal College of Art. Photo: Dominic Tschudin.



Another project demonstrates new ways of thinking about the invisible transactions from excess data as a product of our daily urban existence. *Colony*, 2014, was a cross-disciplinary collaboration between IED student David Hedberg and Printmaking student Gabriele Dini with Orestis Tsinalis and Dr Koen van Dam from the Digital City Exchange programme at Imperial College London. The project utilised live data from tube journeys, office power usage and tweets, rendering each in summary as dripping honey from a large handcrafted honeycomb. The intent was to ‘create meaningful connections between data and the citizens of London’¹⁰. The project was shown at the London Design Festival, V&A Museum, and proved very popular with viewers.

¹⁰ *Colony* formed part of a larger project undertaken by Karin von Ompteda and funded by the Sustainable Society Network+ (<http://sustainablesocietynetwork.net/>).

Figure 7. *Colony* (2014) was a cross-disciplinary collaboration between David Hedberg, Gabriele Dini (Royal College of Art) with Orestis Tsinalis and Dr. Koen van Dam (Imperial College London). Image courtesy of David Hedberg.



10 Conclusion

Returning to Oven and Predan's earlier question: 'What do you make of it?', I would suggest that we need a fresh look at design education and its curricula; agility, criticality, collaboration, and interdisciplinarity are now key to this process. This paper has explored how the art school context, especially with an affiliation with science and industry, continues to inform the development of design research and curricula. Taking the work of the Experimental Cartographic Unit in the 1960s as a starting point, it has demonstrated how the ethic of bold collaboration has endured into the 21st century; and in particular, the ways in which students and researchers are transforming information into experiences *through* design. Arjun Appadurai wrote in the foreword to *Design as Future-Making*, that 'Design is fully conceived as a practice that continuously reimagines its own conditions of possibility.' (Yelivich and Adams 2014: 9) This act of reimagining is where fluidity resides. It is where new paradigms come into view and conventional boundaries are broken down. This, coupled with

advances in digital technology, is fostering new kinds of communication practices, which have the potential to impact on not just education but society at large.

I'd like to end this paper with an example from David Hedberg's final degree show (MA IED) project *Smile TV* (2014).

Figure 8. *Smile TV* (2014) project by David Hedberg as part of his final Degree Show at the Royal College of Art. Image courtesy of David Hedberg.



The project began as an aesthetic response to poor television reception from ineffective TV antennae. Hedberg argued for a new kind of receptivity, which was responsive in its form as two-way communication. *Smile TV* uses facial recognition technology embedded in a TV set (inspired by televisions from the past century). By presenting a clear image only when the viewer smiles the TV screen, the invention prompts us to reconsider the viewer's engagement and how content is accessed. (Hedberg 2014.) This parallels the spirit in which we should be viewing a future for design education; the way we can imagine and realise new potential. I am smiling.

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About the Author

Teal Triggs is a Professor of Graphic Design and Associate Dean, School of Communication, Royal College of Art, London. She is also an Adjunct Professor at RMIT, Australia. Previously she was co-Director, Information Environments – a research network across University of the Arts London as well as Acting Course Director, MRes Information Environments and Course Director, MA Design Writing Criticism. As a graphic design historian, critic and educator she has lectured and broadcast widely and her writings have appeared in numerous edited books and international design publications. Her research has focused primarily on design pedagogy, self-publishing, and feminism. Teal has received several project grants for her work on feminism and design (AHRC) and more recently, she was recipient of a Harry Ransom Center Fellowship for the Humanities, University of Texas at Austin, where her research focus has been on the American editor Fleur Cowles and her influential lifestyle magazine *Flair* (1950-1951). Her research has also extended into community-based learning projects including 'A Sense of Place: Life Histories of Residents on the Aylesbury Estate' funded by the UK's Department of Business, Innovation and skills, as well as 'Creative Connexions: Thinking about Thinking', exploring craft and design education at the National Institute of Design, India. She has also led a number of interdisciplinary research teams in developing methods combining social science and design-led solutions including co-Investigator on Designing for the 21st Century Research Cluster: 'Digital Design, Representation, Communication and Interaction: Screens and the Social Landscape' (AHRC). Teal is also Editor-in-Chief of *Communication Design* (Taylor & Francis/ico-D) and co-editor of *Visual Communication* (Sage) and Associate Editor of *Design Issues* (MIT Press). Teal has just completed her first children's book titled *The School of Art* (Wide Eyed Editions) and is currently co-editing with Leslie Atzmon *The Graphic Design Reader* (Bloomsbury). Her previous books include: *Fanzines* and *The Typographic Experiment: Radical Innovations in Contemporary Type Design*, both published by Thames & Hudson. She is a Fellow of the International Society of Typographic Designers, the Royal College of Art and the Royal Society of Arts. <teal.triggs@rca.ac.uk>