

**Work on the Move:
Mobilities of Creativity and Design Ideation.**

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Abstract.

This thesis focuses on the development of original design 'ideation' processes (the formation of ideas or concepts) set within the context of both commercial museum and exhibition design contracts and product design pedagogic research. Taken together the published works that accompany this submission explore the impacts on productivity and creative problem solving when working away from a physical fixed studio or office-based environment. They also examine the significance of 'shared place' when working directly with a client in situ, as well as place-based influences upon the business of the client. This thesis identifies location as part of the design process and examines the effects of time restriction and working 'in transit' upon creativity and productivity. The integration and impact of new and emerging mobile technologies on creative workflow processes is also explored in the context of my own practice between 2007 and 2019. I define my workflow process as the journey from idea generation and development through to production, manufacture and installation.

My contribution to new knowledge is the creation of an ideation methodology made up of assembled methods which are defined by drawing, mobility and moving image. I have established methods of using drawings as props to facilitate design ideation. I have developed visual schematics tools to communicate teaching and learning feedback loops. I have built on the concept of learning spaces as the static stages of learning and developed a process of using the time moving between locations as a fluid learning space to allow for observation, reflection, discussion and ideation. I employ moving image as a tool to capture feedback and curate the design processes. I consider my methods original by virtue of their cross-disciplinary approach and use of different methodologies.

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List of Publications

Conference Presentations and Proceedings.

Carousel.

Stamp It.

Using Moving Image to Facilitate Storytelling and Ideation.

Sand Casting on the Beach.

Work on the Move.

Professional Design Projects.

Making It, Play On, Careers Hive.

Space Station.

Dunblane Museum.

Knowledge Transfer/Exchange.

Elgin Cathedral: Elgin Stones Exhibition.

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Reptile Keeping Kept Real.

Eat in the City.

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And finally, a nod to the countless bars, cafes, hotel rooms, plane and train journeys - my 'Work on the Move' spaces.

1. Introduction

1.1 Context for the Research.

To give context to the development of this thesis I would like to comment on the changes in working methods within my own career since I began in the creative industries. My professional design career started at the beginning of the 1990s and in those early years my working practice needed to be, for the most part, fixed in one location. This meant working from a fixed office, sitting at a large drawing board with a fixed telephone landline beside it. Next to my drawing board was a desk littered with the usual stationary associated with a design office; pens, paint brushes, scalpels, drawing circle templates and French curves. There were tins of glue, rolls of tape plus a tin of 'Clean Art,' a cleaning fluid used for wiping down drawing boards, rulers and set squares (that was before the Clean Art factory burnt down and the product was replaced by lighter fluid!). On occasion an ash tray would appear to ease the pressure of a looming deadline or working through the night. Two flights below my office was the only fax machine in the building that served eight other small design practices. Beside the fax machine was a door that opened to a room lined with plan chests and racks of shelving, storing drawings, models and paper files. The graphic reproduction for any presentation artwork or A1 architectural and engineering drawings required a 20-minute walk out from the office building to a copy shop, which also served the wider design community in that area. To pick up a set of copied drawings usually meant an end-of-day or next-day pick up. The sharing of information (drawing packages) between client, contractor and designer was mainly by post (envelope, stamp, post box - 5:30pm last pickup), or heavily- edited, black and white drawings and text created on multiple sheets of A4 paper put through a fax machine.

Jump forward some 29-years later and the same design 'workflow' and processes described above can now be delivered from a hand-held smart phone, tablet or laptop. These mobile technologies are supported by powerful word processing programmes and other office applications. They offer tools for

photography, video editing and face-to-face conference calling, which are immediate, accessible and affordable. Further still, my smart devices are not slaves to a fixed location and, as a consequence, my office can be mobile too. I now work from multiple locations: on trains, planes, in parks, cafés, hotel rooms or garden sheds. This represents a shift in thinking about the meaning of workflow, where we work and how we engage with our co-workers and broader communities of practice. These shifts have influenced the development of my own design process methods within both my commercial and pedagogic practice. This has profoundly impacted my working relationship with clients and the development of higher education design programmes both nationally and internationally. The designer as a traveling figure, interacting between different clients, contractors and locations, whose making and belonging is embedded in traditional artisanal culture, is highlighted in Sennett's (2009) *The Craftsman*. Here he describes the craftsman as one who fuses cultural production with social values. Sennett argues that 'learning becomes local' (p.179) and involves processes of improvisation where micro-environments inspire and produce experiences and forms. Sennett's craftsman moves through society, responding to hidden and complex orders and materials. His work reminds us that relations between place, making and materials are fluid and it provides design research and tools through which we might 'approach the world in order to discern the preconditions of a design' (Harold and Stolterman, 2012, p.120).

The Work on the Move immersive mobile ideation method started to evolve in 2014 as a consequence of the above experiences. It is a process-driven method that uses multiple locations within an outdoor setting and movement between venues, all of which function as learning places. This ideation method has since been supported, implemented and developed with a range of commercial and educational collaborators. These include seven Erasmus Plus members in higher education design institutes in Zwolle, Edinburgh, Nantes, Rome, Kortrijk, Warsaw and Oslo. The original aim of the method was to challenge our understanding of conventional working practices. It involved

removing participants from familiar, studio-based surroundings and placing them into urban and rural project-specific environments. This was to encourage them to observe and work alongside local people, business and cultures. This approach could be compared to the concept of immersive journalism as championed by the Vice Media Corporation. Focus is placed on participants talking with each other when walking or moving between different locations. The method highlights an important relationship between travel and the development of knowledge. This is supported in research by academics Oppezzo and Schwartz (2014), who identify walking as strongly influencing the expression of associative memory: 'The act of working and experiencing a variety of external stimuli increased talkativeness between participants. We hypothesised that when walking, people generated more ideas, and more of those ideas were novel and site-sensitive' (2014, p.148). The themes outlined by Sennett help to contextualise the selected published works that support my thesis. *Work on the Move* develops Sennett's discussions about the inspirational qualities of micro-environments and engaging in the practice of improvisation. Sennett also explores relationships between place, making and materials. In 'Sand Casting on the Beach' - a series of pedagogic and research projects - I developed these ideas through practical workshops and publication.

Since 2014 I have been working on a series of international jewellery-making workshops that explore the impact of outdoor environments on learning outcomes. They also introduce principles of sustainable working methodologies and practices within the design process. Participants make models from disposable packaging materials which are cast in tin directly into the sand on local beaches using found timber to create a heat source for melting the metal. The workshops were developed as a response to a growing concern within higher education product design about the loss of workshop facilities and a consequent demise in teaching traditional object-making skills and material experimentation. The loss of workshops and tangible 'learning-by-making skills' have resulted in lost opportunities for a resource to address

sustainable thinking, design and manufacture 'praxis' within higher education design programmes. Furthermore, as learning spaces are frequently discussed in design research, there seems little focus on how an outdoor environment might influence learning outcomes, particularly with regard to material teaching and sustainability. I develop Sennett's 'learning becomes local' commentary, discussing it through my work with Carousel, an international student and staff short-term exchange programme. I have been a co-organiser of Carousel, a collaboration between seven international design institutes, since 2012.

Carousel is a recurring one-week exchange workshop running throughout the academic year. It explores the potential of shorter, collaborative programmes in comparison to the longer Erasmus Plus student exchanges. A key objective is to steer visiting collaborators away from their familiar studio/university environments and engage them with local communities, cultures and customs. For example, a Carousel workshop developed in Zwolle (the Netherlands) engaged with local farmers who were transferring their core practices from crops to livestock farming and incorporating agricultural education visitor centres into their sites. In Edinburgh, our Sand Casting on the Beach workshop collaborated with the only surviving green sand casting foundry in the city. We were able to share fading traditional casting skills and knowledge with new design applications and processes. The Carousel project is now working collaboratively with Work on The Move. Its outputs have been disseminated at international conferences E&PDE, iJADE, Cumulus and HEA. It was also the prime ideation method employed at the 2017 Design Thinking conference, which I co-led, hosted by Edinburgh Napier University.

My thesis is contextualized through both industry and pedagogic case studies. Research is focused on this integrated approach to working between higher education and professional practice. It generates and validates contributions to new knowledge by testing, developing and sharing ideas between these environments. This symbiosis, which plays a significant role in my work, is

echoed by Briggs: '[It] is an on-going exchange which unfolds across different texts at different times, between different people,' (Briggs, 2010, p.11). I examine how shifts in mobility, place, time and digital information networks influence how and where we conduct our working praxis. I also acknowledge the importance personal reflection has on the transformative influence of the self-narration of the designer's experience. I argue that a slower peripatetic design relationship with the environment brings the designer closer to the social world and aligns design research, collaboration and creative outputs. My ideation method is built upon three core foundations: drawing, moving image and mobility. All of these serve to create an environment of co-design and co-creation within the early stages of ideation. These concepts are aptly described by Sanders and Stappers (2008) for 'creating new domains of collective creativity.'

1.2 Process Versus Outputs.

Some of my project examples illustrate the end outcome but not their development process. In these cases, I refer to the commentary of Harrison (cited in Elkins 2009, p.44), who writes 'the medium of communication (of knowledge) must ultimately be works themselves not the descriptions of them or assertions about them.' This is useful because it reminds the reader that the works in my portfolio have been developed as a result of a specific design process and method. These have been successfully applied over different media and creative sectors. Sullivan (2006, p.171) states: 'As we have seen, for many artists their practice is mediated by systems of making or systems of communication, yet for others it is not a collective context that characterises their art-making but the way they make use of tools or techniques for particular purposes and pursuits.' Munro (2011) comments further that new knowledge can emerge from documenting the processes of creative practice, and not just from the finished product and its effect on the environment. With regard to my thesis my contribution to new knowledge, is the process not the outcomes.

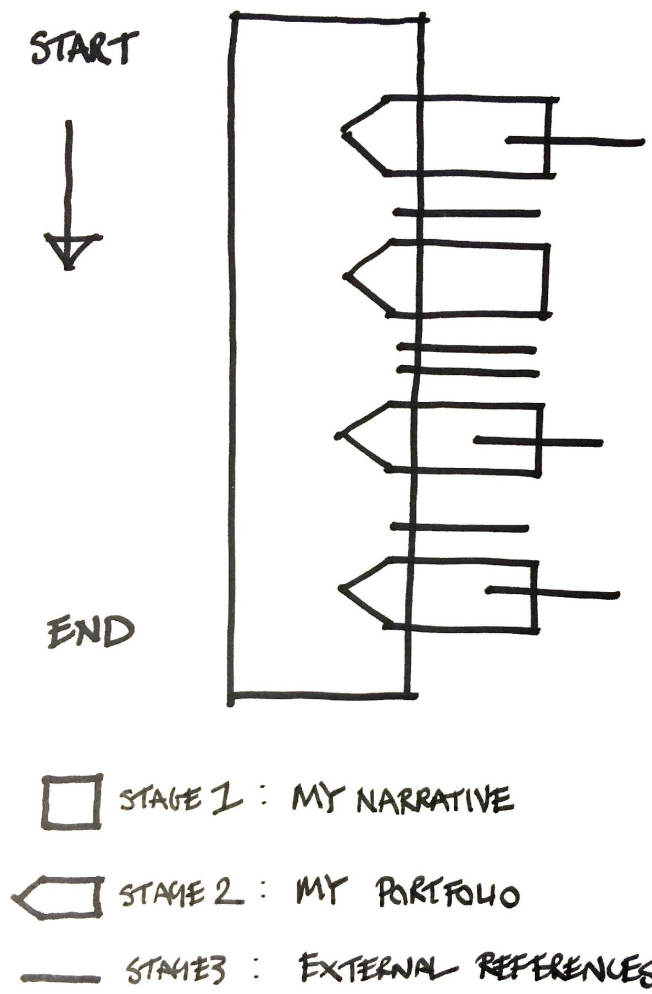
When writing a subjective thesis like a PhD through publication, which is in part a critique of one's own working practice, it is important to consider the objectivity and legitimacy of the ethics and data associated with the projects. Monaco (2010) warns that auto-ethnographic work goes beyond 'confessional recollection to reflective critique.' This chimes with Couldry's 'principle of accountability' (2000, p.126) which states that we must employ the same theoretical frameworks to analyse ourselves as when analysing others. Ellis, Adams and Bochner (2010) and Munro (2011) refer to the importance of self-interrogation for critical reflection and interpretation. I also recognise potential for insights into new knowledge facilitated by the intersection of personal accounts and contextual vantage points. These afford a unique contribution to social science. 'Personal narratives can address several key theoretical debates in contemporary sociology: macro and micro linkages; structure, agency and their intersection; [and] social reproduction and social change' (Laslett 1999, p. 392). Reflective practitioners are described by Banks (2006, p.140) as 'more confident about their own values and how to put them into practice; they integrate knowledge, values and skills; reflect on practice and learn from it.'

My portfolio of case studies should read as a hybridised account of an ideation process, straddling different media, technologies and creative sectors. These include 'intercultural,' Fred Myres (2002, p.6), and 'transcultural working collaborations,' Sullivan (2006: p.171), ideas that are supported by 'linking concepts from the literature to the narrated personal experience, Holt, (2001), Sparkes, (1996). My pedagogical outputs contextualise my contribution to new knowledge in established academic methods. They are disseminated in papers, publications, journals and at conferences. My commercial projects have tested my ideation outputs and impacts. 'Knowledge that is embodied in practice, argued in a thesis, and constructed as discourse within the institutional setting all contribute to new knowledge,' Sullivan (2006, p.83). Judith Mottram (cited in Elkins, 2009, p.23) presents concepts of domain knowledge and strategic knowledge within art and design education. Her ideas

are useful when considering my own ideation methods. She refers to 'knowledge about past achievements within the domain which might be enshrined in all those artefacts and records of past activity that might come to be embodied in all recorded artefacts or records of future activity.' By strategic knowledge she refers to 'the active understanding of how to operate within the domain - how to undertake meaningful action. Either of these, or a combination would speak to the appropriate arenas for enquiry by doctoral research students.'

I have aimed to make my writing clear and accessible, minimising industry and academic jargon for a broader audience than just the creative industries. My ideation methods also consider how we live day-to-day, balancing work, play and well-being with technologies that help rather than invade our days. My auto-ethnographic approach chimes with Bochner, Ellis, Goodhall and Hooks, in its aims to make personal and cultural experiences meaningful and engaging. It produces accessible texts for diverse audiences often dismissed by more traditional research.

My thesis was written in three stages. Below is the graphic illustration I created to represent the method guiding my process, (Fig.1). During the first stage, I wrote from personal experience to clarify the narrative and structure of my writing. In stage two, I referenced projects from my portfolio within the text to evidence critical reflection. In the final stage, I integrated my literature review throughout the thesis to contextualise the work. This approach helped break down the task of writing.



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(Fig.1) My thesis writing process.

1.3 Methodology

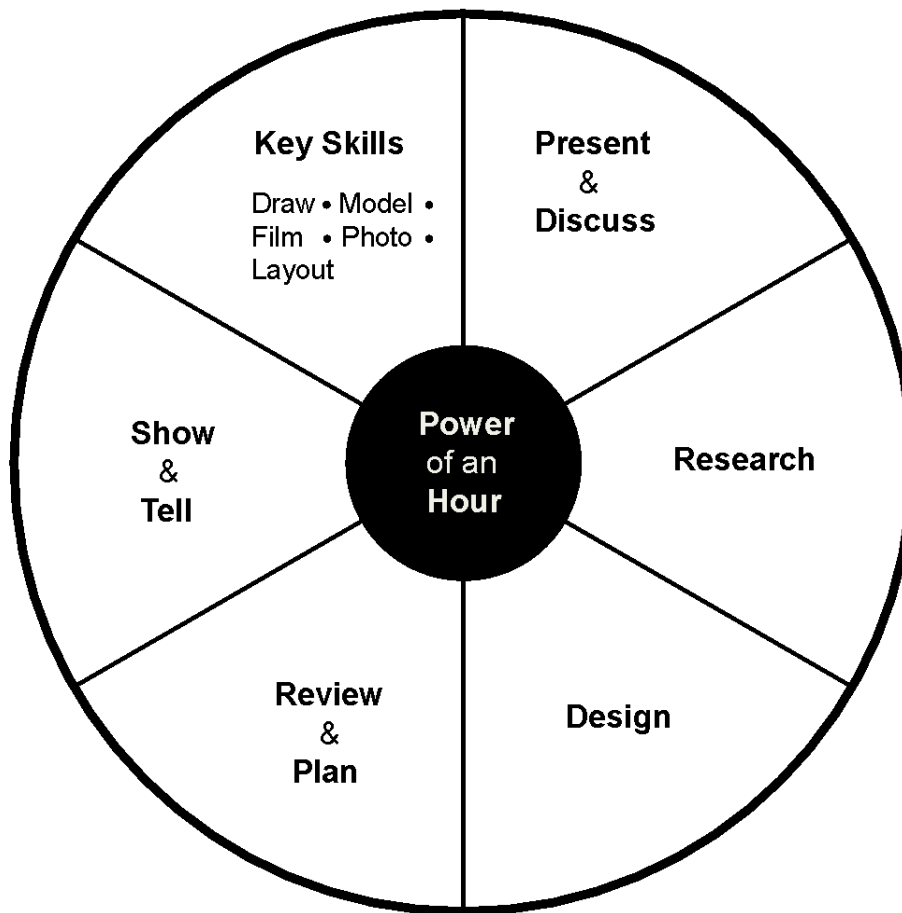
The critical appraisal that accompanies my work includes an auto-ethnographic account of the processes by which I have produced each case study. Ellis, Adams and Bochner (2010) refer to auto-ethnography as 'an approach to research and writing that seeks to describe and systematically analyse personal experience in order to understand cultural experience.' Sullivan (2006, p. 83) defines contributions to new knowledge as 'knowledge that is embodied in practice, argued in a thesis, and constructed as discourse within the institutional setting.'

Some of my case studies were produced over a decade ago without the awareness that they might be used for future research. Commentary and evaluations were drawn from returning to these case studies and analysing them through self-narration and the retelling of my own experiences. This was all contextualised against the writings of others. This approach aligns with Bruner, Denzin and Freeman, who state: 'Usually, the author does not live through these experiences solely to make them part of a published document; rather, these experiences are assembled using hindsight,' (Bruner, 1993; Denzin, 1989; Freeman, 2004). This is useful in discussion of my research on using new and emerging technologies like the iPad and smartphone, now common technologies in the workplace. The approach is further supported by Clough (cited in Wall, 2008, p.42). He writes: 'because there can be no return to some original experience, experimental writing means rethinking representation to engage with subjectivity that does not depend on representation as currently understood and to shift from representation to processes of presentation without beginning or end.'

The primary research methods used throughout my work have been rooted in case study (Yin, 2009) and participatory observation (Clark et al, 2009). Feedback and evaluation for each case study was by means of a variety of data collection tools, observation, field notes, photography and filming (Flick, 2014). This also included analogue and digital visual note taking, which proved

‘powerful for facilitating, understanding and communicating abstract ideas’ (Averinou & Pettersson, 2020). Audio recording and video testimonies were used for some case studies. Depending upon their use, interviews were transcribed verbatim and the participants anonymised. In other studies, participants were happy for their personal testimony to be used for future public dissemination. Written feedback collected through more traditional questionnaires were also deployed. Aligning with the focus of this thesis, verbal conversation and feedback was sometimes facilitated through walk and talk activities. Each feedback process consisted of a combination of direct structured questions, semi-structured interviews (Neuman 2000) and free expression of the participants' experiences. Options for different feedback methods gave everyone an opportunity to contribute in a way that felt comfortable. After each case study the facilitating team allowed for debrief and evaluation time.

All case studies were united by the use of a collection of themed ideations, methods and tools. This meant that findings from each case study could be developed for the next. One example of this is a teaching method I developed called Power of an Hour (Fig. 2). I use a time sensitive approach as an ideation tool within both my design practice and teaching. I divide teaching into a series of one-hour tasks which maintains the momentum and variety during the day. This builds on Cross (2011, p.34) who defines such parameters as ‘rules of engagement’ that provide ‘operational limits’ within which to refine and improve innovation.



(Fig.2) Power of an Hour. This diagram shows different teaching activities broken down into one hour periods of time. The facilitator can use all or a select few activities.

1.3.1 Reflection on Methods.

It was evident in each case study/workshop that the facilitators needed to be experienced product designers. Their particular training and skill sets gave them the tools to negotiate the case studies and work with participants in the context of this research. It was important that when facilitating an event, they demonstrated process and competencies early and throughout the workshops. Sharing their expertise and authenticity built bridges of trust between both parties, which validated the experience. Facilitators needed to be mindful not to use these skills to intimidate participants, but to encourage and empathise

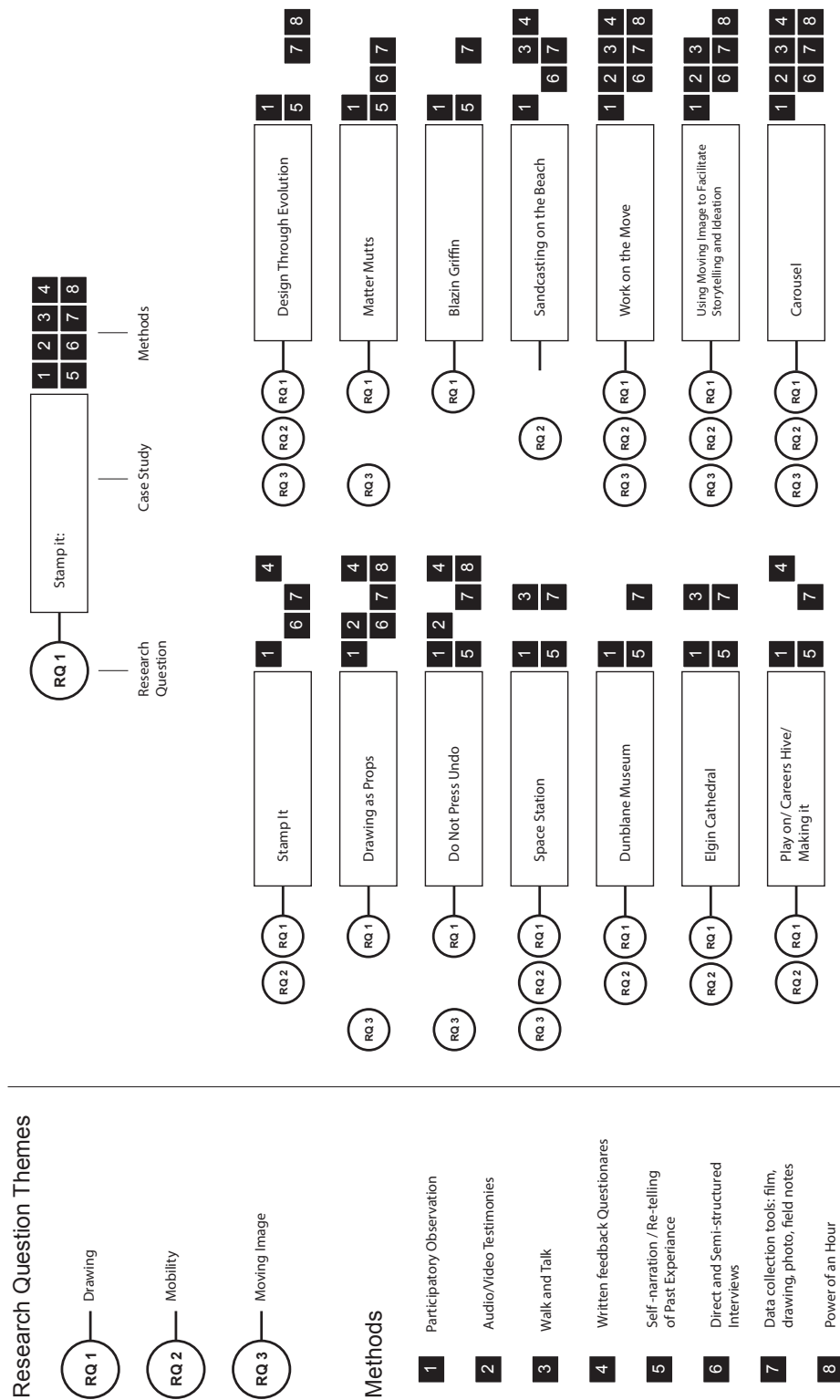
with them. Each case study had elements of the unexpected. If the workshops were facilitated by more than one person, it was important that they were familiar with each other's working practices and skill sets. This meant unexpected opportunities could be created instead of the confusion or competition of a team 'out of sync' with each other. It was important that each methodology was grounded by something tangible at the end of each workshop/case study - e.g. a product, proposal, sketch, film or model. Their success was realised by participants addressing their own specific issues rather than simply just attending and experiencing a new ideation methodology. The goal of workshops is to establish future relationships with clients.

Continual feedback during the case studies was vital. It enabled participants and facilitators to engage with learning in situ and adapt it if needed. In most cases, the primary feedback method was by visual note taking and sketching. A constant flow of drawings and illustrations were generated between participants and facilitators. These were used as visual aids and as reminders to keep track of progress. Drawings became tools to start new conversations or act as icebreakers, forging new relationships within the group. The group would meet regularly to review progress through the drawings produced. The value of this process was to create one collaborative unit between facilitator and participant. There was a primary 'scribe' responsible for curating and disseminating an overview of the event. Verbal and anecdotal feedback was given directly to facilitators. The walk and talk method facilitated by Work on the Move proved the most effective tool for generating conversation and feedback loops. Interestingly, the use of mobile phones to share images and research content was used less when outdoors.

Group size was also a consideration and around eight outputs per session was optimal. Feedback was easier to manage as participants and facilitators could switch between groups and contribute to a variety of conversations and activities. Smaller groups made it easier to access some locations and travel together on public transport. It was easier to book a table, crowd around a laptop screen and communicate in public spaces. Larger groups were divided into smaller teams of three to four.

The following visual diagram (Fig.3) maps the various methods applied during the case studies and how they relate to the research themes.

Mapping Methods to Case Studies and Research Themes



(Fig.3) Mapping methods to case studies and research themes.

1.4 Portfolio of Published Works.

My research focuses on themes of nomadic/mobile working praxis and hybrid ideation methods. It engages physical making skills with digital/analogue drawing techniques and moving image processes. This is contextualised via my pedagogic and professional practice and developed through collaboration with national and international higher educational research partners.

It is important to acknowledge the profound impact my dyslexia has had upon my workflow and ideation methods. I give a more detailed account of this and the challenges it presented writing my thesis in Appendix A.

My portfolio comprises five conference papers/presentations, three commercial design projects, two knowledge transfer projects, three public engagement projects and one widening participation workshop. These were produced between 2007 and 2019. Each project demonstrates how my professional practice links with my academic publications. My role on each of these works has been either as lead academic/researcher or lead design contractor/consultant. The following list of publications are organised by project title and explain their relationship to my thesis and contribution to new knowledge.

Conference Presentations and Proceedings.

Carousel, 2017.

Carousel is a recurring one-week exchange workshop run internationally throughout the academic year by a collaboration of seven product design higher education institutes. It explores the potential of shorter collaborative programmes in comparison to the longer Erasmus Plus student exchanges.

Relation to thesis: Carousel places my thesis in an international context. Working locally at host institutions abroad, I use my Work on the Move method as an ideation process to actively engage with local communities. This enables focused insight into site-specific issues and the community it serves.

Stamp It: Innovative Physical Interactive Assessment LTA process, 2017.

Stamp It involved the development of an innovative analogue, interactive assessment process and addressed the challenges of delivering student feedback and assessment within the creative industries. The delivery system is a rubber stamp that generates a graphical interface showing a feedback matrix that can be applied to any surface. The portable system provides instant feedback onto the physical object being reviewed, for example, a product, building or publication. The process is integrated into the Learning Teaching and Assessment (LTA) for the BDes(Hons) Product Design programme at Edinburgh Napier University. It was disseminated at the Teaching Fellows Conference held there in 2017. The stamp is currently being developed in collaboration with Professor Kay Sambell for a wider UK audience.

Relation to thesis: The Stamp It system is integrated into the 'Work on the Move' method as a feedback tool. Both are characterised by their portability, 'in-situ' delivery and adaptability for different users and situations, lending to one holistic ideation system.

Using Moving Image To Facilitate Storytelling and Ideation, 2016.

The research focuses on how we use moving image and storytelling as a communication platform within higher education product design programmes. It explores how I implement digital platforms; tools, technologies and processes within my ideation method. It is contemporised within our social media culture, which employs moving image and visual storytelling to convey information through platforms like YouTube and Instagram.

Relation to thesis: My contribution to new knowledge employs moving image as part of the ideation process. This is instead of using filmmaking to convey the end project output (for example, through customer sales, marketing and promotion). My research also explores the evolution and use of the smartphone/tablet as a mobile ideation tool, combining camera, editing suite, presentation and online marketing technologies.

Do Not Press Undo, 2016.

This project explored how developments in mobile platforms and digital drawing applications have enhanced the skill of drawing for designers and augmented their impact on creative 'work-flow'.

Relation to thesis: This paper is supported by four case studies described in the following public engagement section of this thesis. The projects are a series of commissioned art exhibitions produced using digital drawing tablets to research new and emerging digital mobile platforms and tools. It poses the questions; what do we save, archive and delete and how could this affect the provenance of an idea and development of a design method?

Sand Casting on the Beach: Introducing traditional making skills, materials, process through play and experimentation, 2015.

The project introduced students to sustainable working praxis and working in site specific locations.

Relation to thesis: The main focus of the workshop was to deliver the teaching in an outdoor environment using found and recyclable materials. Currently this learning and teaching activity is delivered mainly as theory in a lecture theatre at Edinburgh Napier University. I wanted to observe the impacts on LTA of changing the learning environment through the principles of my 'Work on the Move' method.

Work on the Move, 2014.

In 2014, I pioneered and designed an international design research workshop, now held twice a year at different global institutions. It explores new design innovation methodologies. We collaborate on new research and I was the leading academic behind the paper, Work on the Move, presented at Cumulus Nottingham in 2016. The paper won best in category for innovation.

Relation to thesis: The project employs multiple locations and considers the movement between these spaces as 'working' environments for both client and designer. This methodology reframes how we think about working relationships, places of work and how we use our time in work. As a result of this process a variety of new ideation methods have been created. These include the use of mobile digital platforms such as smartphones and tablets. This paper was the catalyst for my thesis.

Professional Design Projects.

The following three projects - Play On, Careers Hive and Making It - illustrate the development of the design of an original mobile, adaptable museum exhibition system I was commissioned to produce by Edinburgh International Science Festival. The project highlights themes of co-design, mobile working and the use of mobile digital ideation methods between designer, client and subcontractor. Of particular interest is the recommissioning, development and testing of the system and ideation process over a documented four-year period.

Play On, 2017.

I was the main 3D designer for this exhibition that was the showcase event in the grand gallery of the National Museum of Scotland. It focused on how people of all ages play and how modern technology is changing the way we play. During the two weeks of the festival 140,000 people passed through the museum. Many interacted with the exhibitions.

Careers Hive, 2016.

This project included the design of a series of four free-standing sculptures, branded information units and activity zones. Careers Hive Week offered students from S1-S3 a new way of imagining their futures. It encouraged them to consider a variety of opportunities for study. STEM subjects included science, technology, engineering and maths. Two-thousand-six-hundred pupils and around 4,000 members of the public attended.

Making It, 2014.

I was invited to work with the Edinburgh International Science Festival (EISF). I designed an innovative, interactive and transformative museum exhibition system for 'temporary' themed exhibitions. These have been installed at the National Museum of Scotland, Science Festival Abu Dhabi and other international venues.

Space Station, 2015.

I was invited to design a themed, interactive exhibition space for the Abu Dhabi Science Festival to celebrate British astronaut Tim Peake's mission to the International Space Station. Over the 11-day run the festival attracted 100,000 visitors.

Relation to thesis: I employed mobile technologies, specifically digital tablets and smartphones to coordinate the project between locations in Spain, Scotland and Abu Dhabi.

Dunblane Museum, 2010.

I was the lead interpretation, design and build contractor on the new museum installation. My scope of works included full turn-key operation, including interpretation, artefact collation, all 2D, 3D and digital design, interior design production/manufacture installation and project management.

Relation to thesis: This project demonstrates a process of collaboration between the designer, manufacturer and client. This involves working at the workshops of subcontractors, often developing and refining details physically in the context of site-specific locations, rather than from a remote studio base.

Knowledge Transfer/Exchange.

Elgin Cathedral: Elgin Stones Exhibition, Historic Scotland, 2015.

I was the lead 3D designer of the new interpretation exhibition which celebrated the return of the Elgin Stones to the cathedral. It was installed across eight rooms in the cathedral's north and south towers.

My scope of works included interpreting the storyline, artefact curation, interior layout and design and production for display cases, plinths, interactions and artefact mounts. This was a Knowledge Exchange research project funded by Historic Scotland.

Relation to thesis: This project exemplifies the ideation process through a co - design approach between designer and client. Due to constraints in time, logistics and budget, both client and design team worked on the design and production drawing phase of the project together in the same location at the same time. This meant all decisions and questions were raised, discussed and resolved during the meetings, minimising miscommunication between participants. This significantly reduced the design phase of the project.

Blazing Griffin: Development of two online games, The Ship and Distant Star, 2012-14.

I completed an SFC Follow-On Voucher working as an art director and concept artist for Scottish-based gaming and media studio, Blazing Griffin.

Relation to thesis: This project gives insight into collaboration with digital design communities and shared virtual workspaces internationally. In

particular, it considers the impact on office culture and interaction between the human self-versus the digital representation of the self (avatar).

Public Engagement.

Sand Casting on the Beach, 2016.

To mark the Queen's 90th birthday, I developed a collaborative design project between Edinburgh Napier University's product design department and the Sixth Form art department at Bo'ness Academy. The school's art department invited me to run the project after its head attended my presentation at iJADE Glasgow, 2015. It focused on outdoor learning spaces as classrooms - in this case, sand casting on a beach.

Relation to thesis: The project explored the impact of physical 'hands on' manual labour to gain tacit knowledge to inform learning.

Matter Mutts, 2016.

I explored the perception and effect of space, time and texture within virtual reality environments in collaboration with Edinburgh Napier University's School of Computing. The output was an immersive, interactive game called 'Matter Mutts' which was exhibited at the National Museum of Scotland during Edinburgh International Science Festival 2017. I was the lead art director and concept artist.

Relation to thesis: The project further develops the concept of mobile/nomadic working. Working with virtual reality generates questions surrounding the need for physical interaction between participants, objects and places. Integrating virtual reality into the ideation process also makes us think about the concept of time, and how that impacts the evaluation of our projects and the speed with which we respond and react to feedback.

Design Through Evolution: The Royal Zoological Society of Scotland, 2015.

I was invited to exhibit and curate my concept design and illustration research exploring the relationship between manufacture and nature. This was part of Exploration 2015 at Edinburgh Zoo in association with the University of Edinburgh, the University of St Andrews, Heriot Watt University and Beltane. This work was developed by research on workflow using digital tablets and drawing apps. It was disseminated in my conference presentation 'Do Not Press Undo' (see conference presentation and proceedings).

The Phantom Entomologist: Summer Hall, Edinburgh International Science Festival, 2014.

I exhibited a collection of my concept art and lighting installations exploring the relationship between insects, technology, architecture, manufacture and design. This work developed my research on work-flow using digital tablets and drawing apps. It was disseminated in my conference presentation 'Do Not Press Undo' (see conference presentation and proceedings).

Zoo for Robots: Edinburgh City Arts Centre and Edinburgh International Science Festival, 2013.

I designed, built, installed and facilitated an interactive exhibition exploring the creative and unexpected uses of redundant technology. Participants were invited to submit small redundant electrical items which I redesigned to create new concept hybrid creatures merging technology and biology. These new 'life forms' were supported by interpretive text introducing sustainable and ecologically themed messages. This installation was displayed in the Edinburgh City Arts Centre. This work developed my research on workflow using digital tablets and drawing apps. It was disseminated in my conference presentation Do Not Press Undo (see conference presentation and proceedings).

Do Not Press Undo: Edinburgh International Science Festival, 2012.

I created an interactive workshop experience at Edinburgh City Arts Centre using iPads, music-mixing programmes and storytelling. Its aim was to make technology more accessible to 'first time' users and also question its role in the environment. This work was disseminated in my conference presentation Do Not Press Undo.

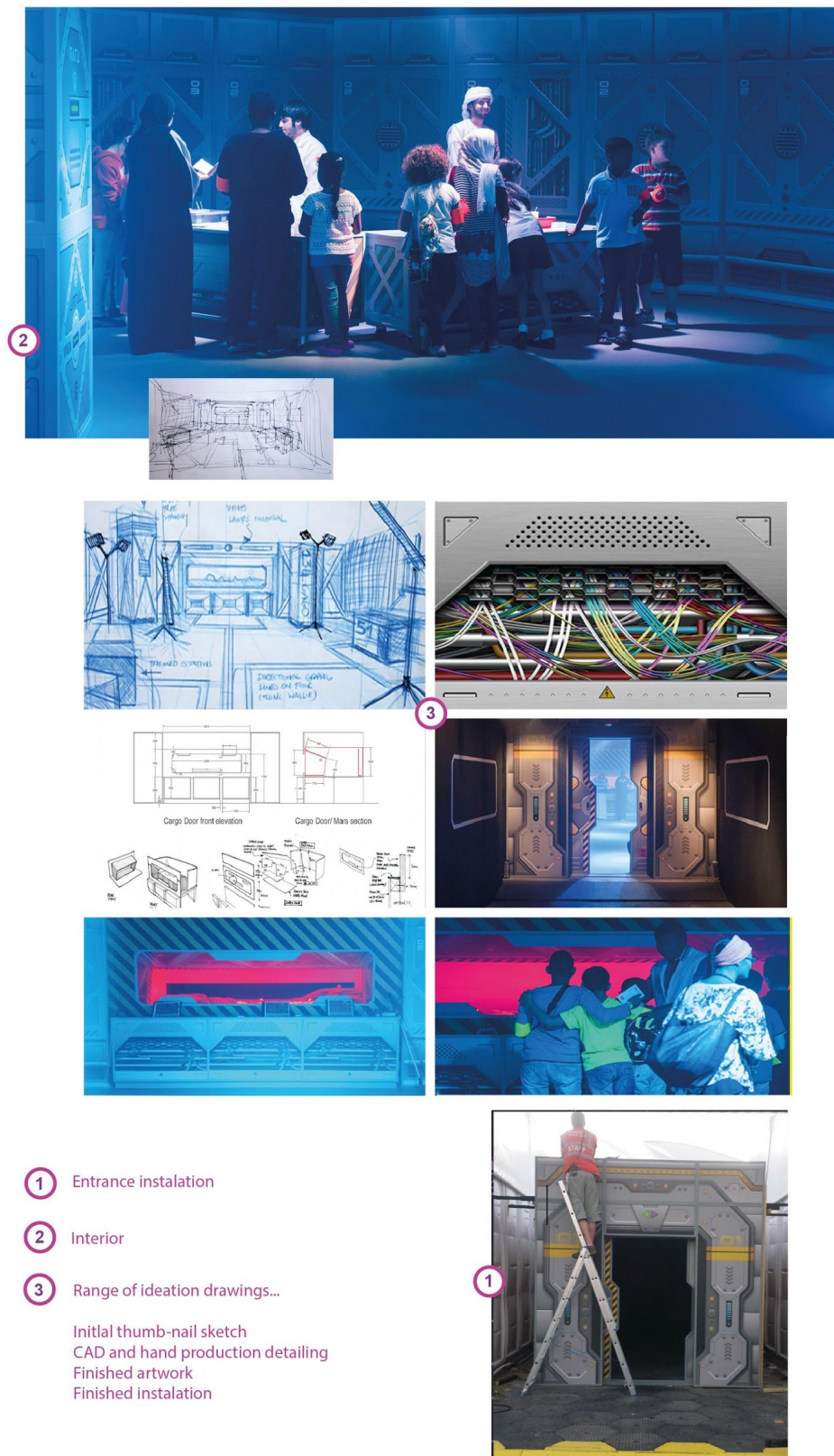
2. Chapter 1: Drawing

Drawing with pen and pencil remains my primary ideation tool. My generation has experienced shifts in technology that have transported drawing methods from an analogue medium with pencil and paper into the digital realm of stylus and screen. In my own practice, drawing embraces exciting new mediums and engages with immersive digital environments like virtual and augmented reality. The impact of this evolution is documented in my projects; Space Station, Stamp It, Zoo for Robots, The Phantom Entomologist, Do Not Press Undo, Elgin Cathedral and Matter Mutts. Each of these demonstrate how I have used different approaches to drawing mediums and processes within my working praxis, and how I use drawing to think, design and interact with others. Of specific interest to my thesis is the impact working with different drawing processes has had on my workflow, including when, where and why I draw. This chapter also explores how communication through drawing influences the relationships between my clients and broader communities of practice. It also establishes 'new domains of collective creativity,' (Sanders, Stappers, 2008).

In this chapter, I explain why I draw and its influence on my ideation methods. I examine who I draw for and why the medium is my primary process of communication with co-workers, clients and contractors. I then look at how I draw, exploring different methods, tools and mediums, when and where I use them. I highlight projects that take a hybridised approach to both digital and analogue drawing and how I developed them to aid my ideation process. My portfolio shows work ranging from pencil drawings on bus tickets through to projects created within virtual reality environments. Each of these examples show an appropriate use of drawing that speak to the needs of different clients and their specific design briefs. The final part of the chapter illustrates how I have developed my drawing in novel ways, e.g. turning two-dimensional images into three-dimensional props to facilitate role play, storytelling and film production - all to communicate design proposals. The use of drawing within

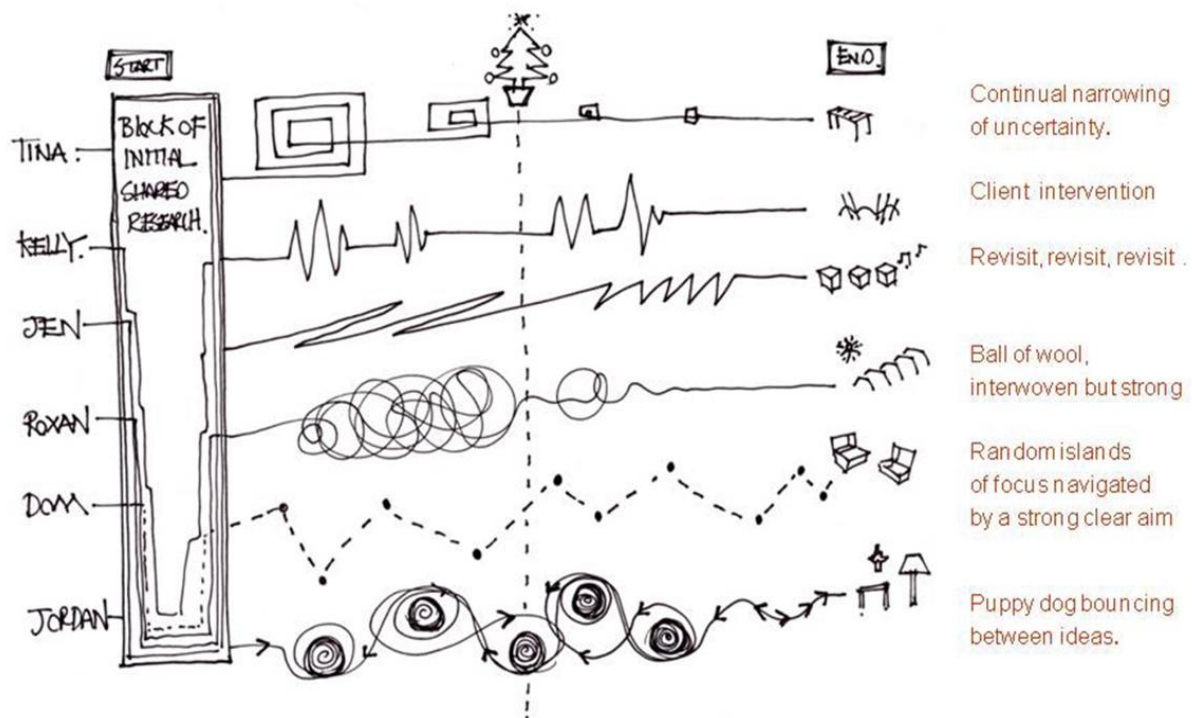
my ideation method also considers the future role of the designer and the relationship with communities of practice.

I use drawing to visualise my internal dialogue and to connect all participants of the ideation task. I define participants as clients, colleagues, contractors, students and the public. Often my first interaction with participants involves capturing and visualising our conversations in drawings as the meetings take place. These visualisations are produced using three different approaches, alone or in combination. Visuals may be drawings that represent detailed realistic objects or spaces. For example, the project 'Making It' (Fig. 4), shows drawings used to communicate finished structure and construction details.



(Fig. 5) Space Station.

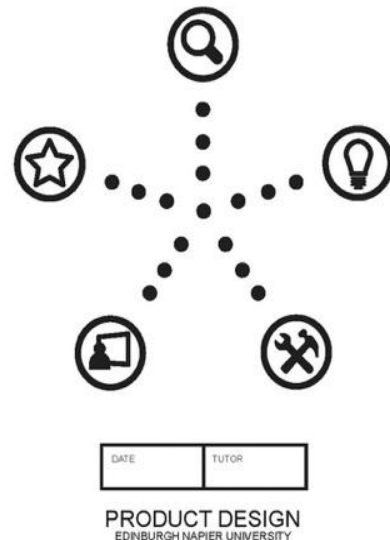
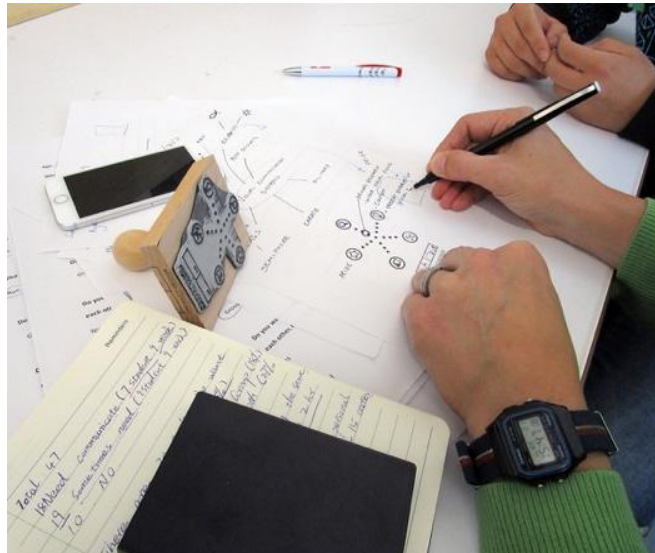
Visualisations can also be abstract shapes or diagrams which explain theoretical ideas or concepts. I use this approach to give students and clients an overview of their progress, (Fig.6).



(Fig.6) Illustrating the concept of different learning approaches of final year product design students over a 30-week period.

The project called Stamp It (Fig.7) employs abstract diagrams to communicate feedback and assessment to students. I devised and collaborated on this visual, innovative analogue assessment project with my co-worker, Ruth Cochrane, at Edinburgh Napier University. Its aims are to address the challenges of delivering student feedback and assessment within the creative industries. The system uses a physical rubber stamp loaded with ink impressed on the pages of student sketchbooks. The stamp carries a graphical diagram which the tutor draws on to give feedback. The visual system quickly and simply captures student progress during the ideation

process and summarises it in a clear and simple line drawing. User feedback on its playfulness and how introducing this physical intervention sparks conversation.



(Fig.7) 'Stamp It' assessment and feedback system.

Stamp It develops the work of Wenger (2000, pp. 222-238) which suggests that some 'boundary objects can act as tools and artefacts and 'play a crucial role in connecting multiple practices.' Stamp It creates and represents a marked point in time where learning takes place. This visual system of data capture talks also to the work of Kettley (2006) and Sutton (2013) who assert that; 'Visual schemas mix diagrammatic metaphor with linguistic explanation; they are open to interpretation as a deliberate invitation to shared critical thought and the co-creation of meaning around the process,' (Sutton 2013, p.214). I enable participants to see their contribution to a project using different visual methods. This echoes Jungk's observation (cited in Sanders and Strappers, 2008) that 'participation at the moment of idea generation is critical if we want our participants to engage in a level of co-design/co-creation with their designers'. Gillian Rose (2016) argues that the visual is not simply a mode of recording data or illustrating text, but a powerful medium through which new knowledge and critiques might be created. Stamp It develops this

argument and makes its contribution to new knowledge, evolving a new feedback method to chart the creative process used within Higher Education design programmes. It further builds on Pink (2015), who argues that images are part of contemporary reality and that a shift from text-based to image-based theory affords us a way of learning from images and how they might shape our thinking. Stamp It was disseminated at the 2017 Teaching Fellows Conference at Edinburgh Napier University and is now a core learning, teaching and assessment tool integrated within the BDes(Hons) Product Design programme at Edinburgh Napier University.

2.1 Visual Documentation

When meeting a client for the first time it is important for me to establish trust, empathy and confidence in the relationship. I use drawings throughout design meetings to capture conversations, ideas and goals and generate real-time visual feedback. Visual documentation also shows that I am listening to the client and capturing our joint vision whilst demonstrating my professional expertise. This collegiate approach can be viewed in the context of co-design and co-creation methods used within the creative industries. John Chisholm (2019) defines the concept of co-design as a well-established approach to creative practice particularly within the public sector. Co-design is often used as an umbrella term for participatory co-creation and open design processes and has its roots in participatory design techniques developed in Scandinavia in the 1970s. I refer to co-design as any act of collective creativity between two or more people who must be a combination of user and designer. By producing work with and in front of the project team my drawing method becomes a conduit to focus their collective thinking. It provides an immediate and constant visual reminder of the meeting's progress to collaborators of the design process. Drawing whilst thinking or talking has become fundamental to my practice and one of my ideation skill sets. In *Change by Design*, author Tim Brown (2009) illustrates how he would 'often spend far more time trying to explain to my client what design was rather than actually doing it.' He adds

that ‘the resulting confusion was getting in the way of my creativity and productivity.’

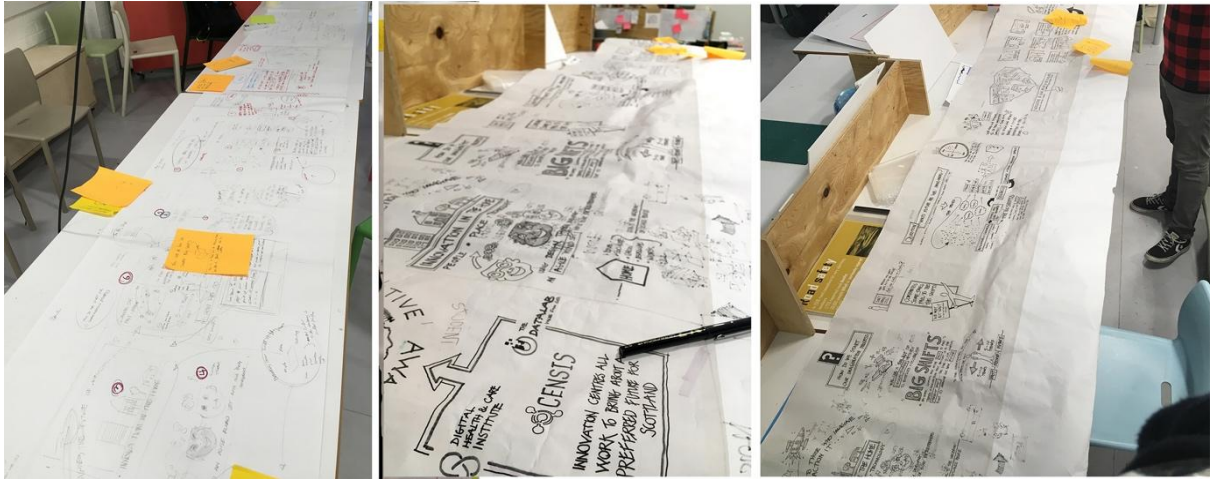
My project ‘Making-It’ (Fig 4) offers an example of building a team dynamic through drawing. This was further developed in the projects Play On and Careers Hive, all commissioned by the Edinburgh International Science Festival. The brief was to design a travelling museum exhibition which could display curated physical artefacts, graphic interpretations and interactive mechanical/digital content. The exhibition was initially installed within the main gallery of the National Museum of Scotland, Edinburgh. It was designed to be reused and adapted for future national and international Science Festival events. The exhibition system needed to be disassembled and removed within a 30-minute window. This was a major challenge for the design proposal because of the possibility that the main gallery might be needed for evening events. This design constraint required close collaboration between the festival stakeholders, the building contractor, logistics manager, content and curation leader and museum representatives. The complexity of the task and short project time scale led me to propose that all project leaders be present at every design meeting. A day a week over 10 weeks was allocated for this task. Leaders were in the same space at the same time to comment on and sign off decisions at the end of each meeting. I relied on different drawing competencies to facilitate these meetings. These included quick concept sketches, presentation visuals and production drawings which contractors could use to cost and plan the project build. My role shifted between workshop leader, workshop facilitator and workshop designer.

2.2 Designer Versus Facilitator.

Projects for the Scottish Institute for Enterprise and the 2017 Edinburgh Napier University Design Thinking conference demonstrate my use of drawing methods in two different co-design contexts. In the former, I acted as designer and in the latter as facilitator. The changing role of the designer from one who not only designs tangible outputs but who uses their design thinking skill set to

gain ‘a deeper understanding of the nature of the design process and a developed sense of how each personalised and particular design process should be designed,’ Nelson, Stolterman (2012, pp. 258-259), is demonstrated here. Sanders and Stappers (2008, P.15) continue the debate proposing that ‘designers will need to play a role on the co-designing teams because they provide expert knowledge that the other stakeholders don’t have. Designers professionally keep track of existing, new and emerging technologies, have an overview of production processes and business contexts. This knowledge will still be relevant throughout the design development process.’

I have worked with the Scottish Institute for Enterprise (SIE) as a commissioned graphic artist since 2018. My role has been to capture, and curate outputs generated from the institute’s series of Scottish Innovative Student Award workshops. These are geared to help Scottish students develop enterprise skills, discover their entrepreneurial talent and initiate their own ventures. SIE runs the programme in partnership with three Scottish innovation centres - DataLab, Digital Health and Care Institute and CENSIS. About 100 students attend these workshops working individually and in teams to develop themes around innovation for Scotland’s future. These include health, home, education and technology. My role at these events is to observe and make visual the participants’ ideas without intervening with design input. My approach is to produce artwork on a continuous roll of paper, which, when complete, can measure seven meters in length and 500mm in width (Fig.8). I keep my drawing style simple using basic shapes and forms with a limited colour palette. This is to illustrate the essence of the participants’ ideas without contributing to the design myself. Artwork is created on the day and finished sections are posted on the walls of the workshop room for the students to observe. As the day progresses, these large-scale drawings alter the environment of the room to reflect the energy and outputs of the day. The room changes to reflect the thinking of its community.



(Fig. 8) Drawing on a seven-metre roll of paper.

This approach encourages self-reliance and confidence amongst the students. They take ownership of their ideas, visualise and discuss them with others and develop them away from the influence of designers and experts in the room. The early stages of the workshop are not concerned with the specific details of an idea. This means the students can be empowered to keep ideating at a conceptual level and produce more diverse ideas. Feedback on this process remains positive and students comment on how it maintains their momentum throughout the day. They can then discuss each other's ideas and workshop facilitators can employ the drawings as prompts to start or develop conversations with the participants. In the book, *The Back of a Napkin* (2008, p. 64), author Dan Roam describes a similar ideation experience. He writes about how he covered a meeting room 'ankle deep in paper, even worse, taping things to the wall,' before a presentation. He goes on to say, 'When our clients arrived a surprising thing happened. We couldn't start the meeting. As people moved into the room, they immediately gravitated towards the walls.'

In 2017, I co-led a Design Thinking Conference at Edinburgh Napier University which employed my Work on the Move method. Representatives from Edinburgh and Glasgow councils, London's Digital Greenwich, the Scottish Institute for Enterprise and Edinburgh Interface Knowledge Connection attended. The workshop was delivered using Work on the Move's 'walk and

talk' ideation model with a small group moving between multiple locations in Edinburgh. Starting the day at the city's Waverley Station, we finished later at our product design studios at Edinburgh Napier University. Through sketching, video/ audio recordings and photography, we captured conversations and ideas. The main method of communication and curation was by way of drawing on a till roll, the type used in electronic cash machines. It was portable, could fit in my pocket, could be quickly rolled out on café table-tops, park benches, floors or spanned between the hands of participants (Fig.9).



(Fig.9) Drawing on a till roll.

I used a similar process at the Scottish Innovation Centre workshops. The till roll provided a logical and linear timeline to the day's events as drawings were produced on the roll in the order they occurred. Its unrolling provided points of collective reflection throughout the day. Participants fed-back on the sense of anticipation, ceremony and event each time this was repeated. Both my till roll and earlier described larger format drawings acted as 'boundary objects' as defined by Snyders and Wengers, (cited in Blackmore 2010). I used my drawn

content to create a connection between practice, identity and the participants. Another of my key skill sets in Work on the Move is the use of boundary objects, process and shared experiences to build a community of practice. Snyders and Wengers (cited in Blackmore, 2010) also write: 'we define who we are by the way we experience ourselves through participation as well as by the ways we and others define ourselves.'

The till roll gave me an alternative to deploying electronic devices and asking people to gather around smartphone screens to review their work. The Design Thinking Conference was facilitated by three product designers/educators. Our task was to balance the shift from facilitating the early stage of the workshop to then moving towards a more design-led role near the end of the day.

We wanted to show that this ideation process can be used for more than just introducing a new design method - it can also be employed to produce design outputs. It considers not only the role of the designer but also the transformative role of the participants who engage with it. I chose the word transformative to refer to the differing levels of design competency and communication skills participants bring to, and subsequently develop, during a workshop. This approach to user participation aligns with Fischer (cited in Sanders & Strappers, 2008) who comments on how participants are able to scale their involvement within a design process, shifting from being passive consumers to expert contributors through a process of adaptive design. This is relevant to my Work on the Move method where people of every ability within a workshop can contribute at any stage of the ideation process. Sanders & Stappers (2008, pp.8-18) reflect on the future role of designers, commenting:

'Designers will be needed because they hold highly developed skills that are relevant at larger levels of scope and complexity. By selection and training, most designers are good at visual thinking, conducting creative processes, finding missing information, and being able to make necessary decisions in the absence of complete information.'

These two examples demonstrate the need for designers to adapt roles and responsibilities to specific ideation tasks. This has informed my understanding of how to facilitate a Work on the Move workshop, and my role within it, as either designer, facilitator, co-designer or a combination of each.

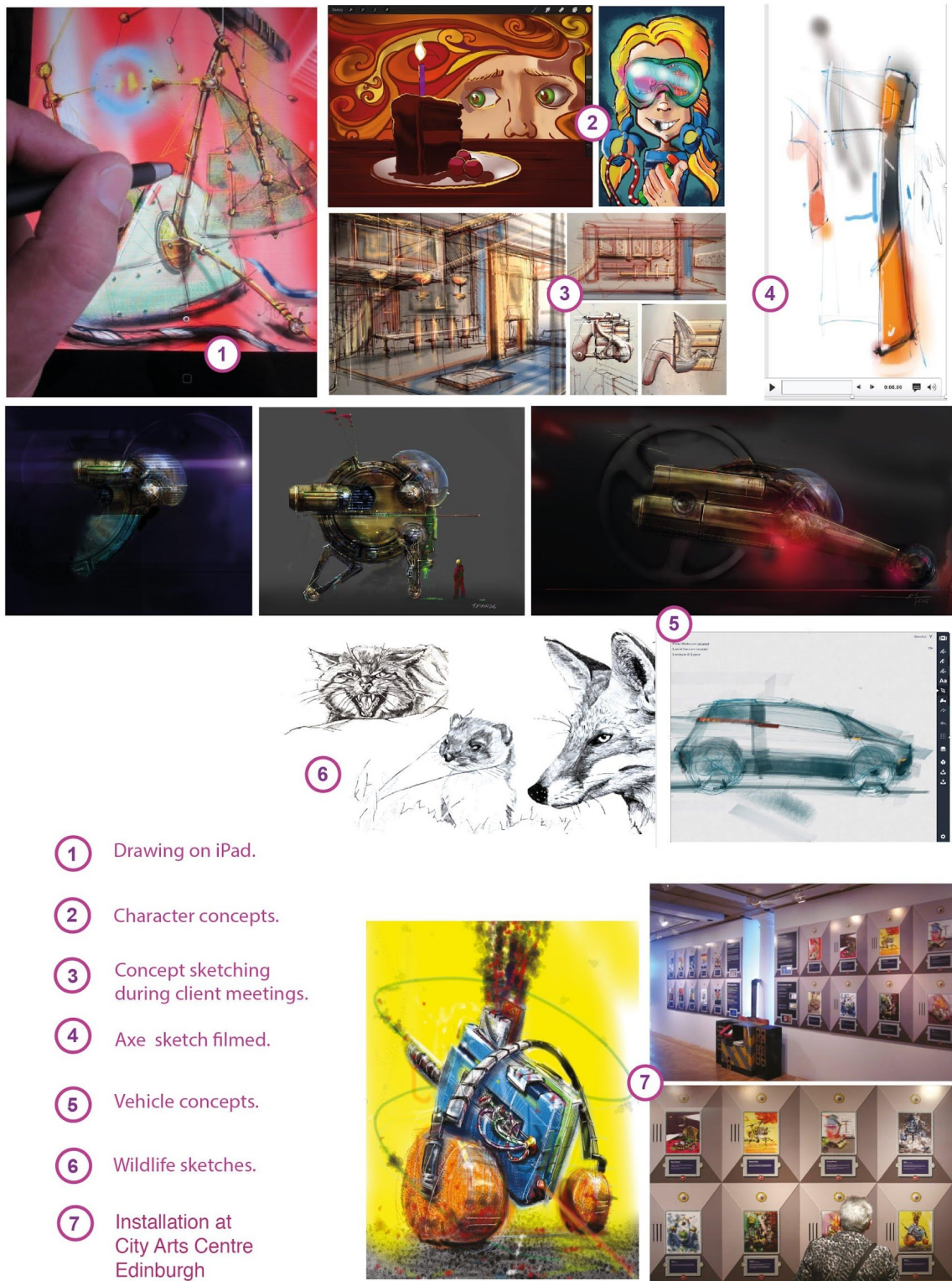
2.3 Analogue and Digital Drawing Methods.

My portfolio uses drawing techniques created through both analogue and digital media. These mediums have impacted my work-flow and the communication of my design intent. I use pencil and paper to sketch out initial ideas and concepts and to map out visually the main stages of the design project. I refer to this as my creation thinking space. In this space, I have limited access to drawing materials; at most, a pencil, biro, marker pen and A4 sketchpad. This minimal tool kit focuses my thinking on the task-in-hand. It means that I am not distracted by having to decide which tool to use and how it might influence my drawings and design process. By eliminating a level of decision-making at this early stage, I have become more skilled at using my drawing tools efficiently and creatively. Analogue medium (pen and paper) is valuable because it allows me to retain what I term 'the scars of my thinking,' which can be more readily erased on digital platforms. I never use an eraser to remove any of my sketches or mark-making. This deliberate lack of intervention is important because it helps me to chart the provenance of my thinking and all the ideas I have visualised along the way.

My project Do Not Press Undo, (Fig.10), explored the concept of 'the scars of my thinking.' This was a collection of public engagement projects which interpreted themes of redundant technologies, insect evolution and ecology. Its outputs included 'concept art' illustrations produced digitally and displayed through mixed media, screen, print and digital projection. The works were exhibited at the City Art Centre and Summerhall, Edinburgh and the Royal Zoological Society of Scotland. Using an early generation iPad (circa 2012) and drawing applications such as 'Sketchbook Pro,' I explored how digital drawing impacted my creative workflow. I shifted from drawing on paper and

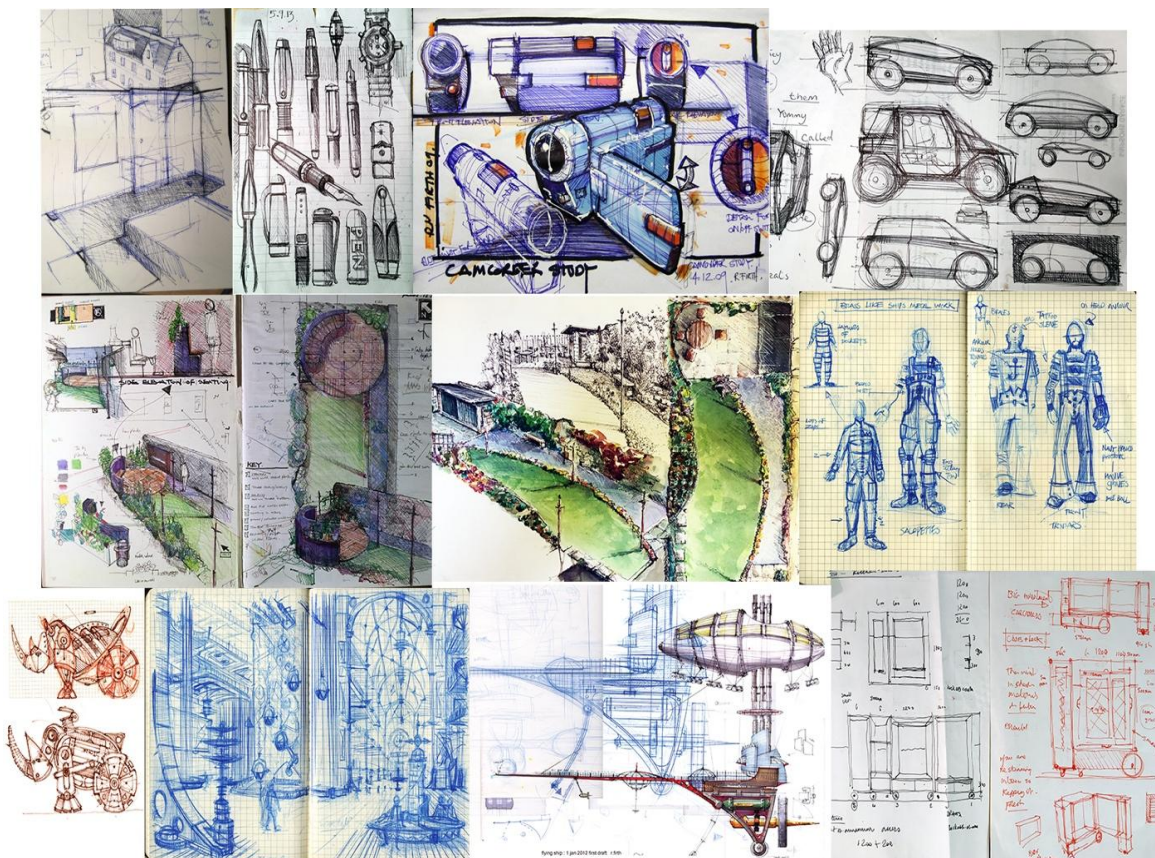
drawing on screen because I needed a more flexible work-flow solution for working from my home office. My children at that time were toddlers and had worked out how to access my home office to find the 'cool pens and paper.' The timely launch of the iPad allowed me to work more freely and efficiently from this environment than my laptop had, especially for illustration work.

The iPad was easy to pick up, compact, simple to use and had all the digital connectivity, applications and support I needed. Battery life was also terrific. David Hockney was an early advocate of the iPad. He used it to create his artwork having become frustrated with the slowness of other computer-based painting and drawing applications. Gayford (2018) comments on how Hockney found that the iPad could respond as fast as his hand and mind. The iPad has allowed me to become a 'digital nomad' and work regularly from home. My productivity has benefited from not being tied to a desk. I work more frequently for shorter spells and can change working locations around the house. This variety of locations and mobility makes me less tired and able to use work time more efficiently. As the iPad evolved, I started to use it further afield; in cafés, on trains, buses and other locations away from my office. Today both analogue sketchbook and iPad lie side-by-side in my work bag and I switch between the two mediums constantly as a hybrid approach to drawing and ideation.



(Fig.10) Do Not Press Undo.

My iPad allows me to explore how digital tools influence my decision-making about what work I save and erase. All the iPad produced artwork in the Do Not Press Undo projects applied the criteria that I would not erase anything. This meant that I had to work with my mistakes. Before this I found that when I engaged in an ideation process purely in the digital realm, I was quickly erasing work I did not like or continually generating more content. In the digital realm I have infinite screen space to work in and not the parameters to discipline myself over the creation of new output. With analogue media, I use the physical dimensions and number of the pages of my sketchbook to contain my thinking. I work into these pages, often drawing on top of original ideas or squeezing others into the space left between my original drawings. The limitations of the physical page discipline the design process and define its endpoint. (Fig.11).



(Fig.11) Projects developed within the limits of sketchbooks pages.

All of my sketchbooks are displayed on the shelves of my office. Some are up to 30- years-old. Their unique history is inscribed on their covers through scribbles, scratches, coffee spills, bent and bashed-in corners. These act as sensorial, haptic way-markers that remind me of the context in which I used the books. They also point to the provenance of the ideas within as living documents that encourage repeated viewing. I seldom go straight to my current project when I open my sketchbook.

Instead I take time to flick between its pages, reviewing past projects and re-engaging with notes and ideas for the future. The physical presence and immediacy of these artefacts has been transformative in contextualising my current design thinking. Conversely, when using my iPad, work is archived in multiple folders on screen which are rarely accessed casually without a specific reason. For me this standardised format of linear presentation represents a challenge and can cause me to forget about or miss stored but invisible information. However, I cannot travel with all my sketchbooks, and the storage protocol of my iPad then comes to the fore as a digital mobile, visual library. This is an invaluable tool when working with clients away from my studio. It is important to remind the reader that it is only in the last eight years, since 2012 when the iPad emerged, that it has been routinely used in the workplace. I was able to take advantage of this digital tool to make a contribution to new knowledge surrounding ideation methods and processes.

In the digital environment, I use my iPad to develop and refine my analogue sketchbook drawings - adapting a reductive approach to my thinking. Working on screen also allows me to enhance my drawings using other data. This additive approach lets me access images and filmic-rich content with references and information from an infinite source of research and technical websites. MacDonald (2016, p.24) says that creative online opportunities allow individuals to 'mash up' music, video, text and image 'to create individual compositions and products. These can be found on fan-sites which provide opportunities to create, disseminate and engage discourse far beyond the

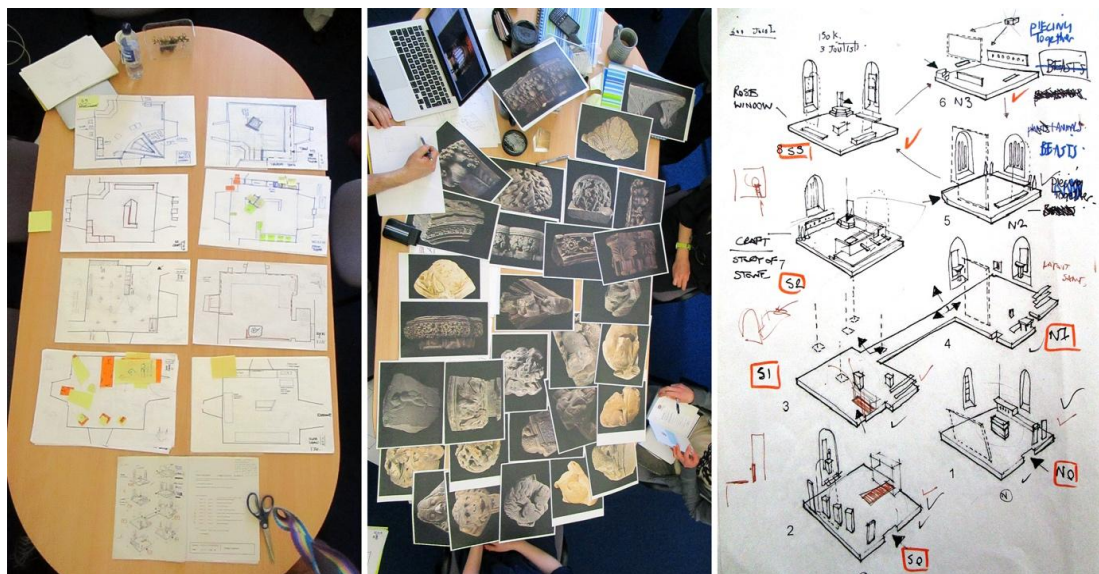
classroom.’ At the beginning of my career I had to go to the office, now the office is in my pocket and travels with me. The iPad affords quick access to my work, easy storage and tools to organise and package it into folders and files that can be readily reviewed or shared. I can do this from my office, multiple other locations and on the move on devices ranging from laptops to tablets to smartphones.

While there are advantages to being digitally connected, I am mindful that I can be influenced by the curated content of social media platforms like Pinterest, Instagram and Facebook. It is tempting to overconsume new content from these sites at the expense of developing information I already have. An important aspect of the Work on the Move protocol has always been to engage in first-hand, real-life experiences. My project Sand Casting on the Beach (Appendix B) exemplifies this. In this workshop, design process participants are encouraged to focus solely on real-life environments, materials, processes and communities. Although the core messages could have been delivered on a screen, I wanted to immerse my students in the physical design environment. The surface of the beach was used during this project as a drawing board. Participants used found sticks to draw into the sand in situ. They drew and communicated on a 1:1 scale, literally drawing into the environment. These outputs were visible for everyone and encouraged conversation between participants and interested observers not connected with the project.

Some participants of Work on the Move workshops lack confidence in their drawing skills, resulting in a reluctance to express their ideas. To overcome this, I suggest they share them on whatever medium they have at their disposal. This could be a bus ticket, napkin or even on the back of their hand. I then ask them to photograph this for later dissemination. The medium on which the notes are recorded reveal something of the provenance in which the ideas were created. Raw information presented as it occurs, without editing or

refinement, empowers participants to contribute to the design process. This method facilitates conversation, collaboration and a sense of community.

Printing information is useful because it allows me to physically spread pages out, eg. on a floor. This gives me the overview of a project and changes the space I am in and how I operate within it. Working with the till roll and large format rolls of paper, discussed earlier, gave me the same overview. This has been useful when working collaboratively. It moves people from a sedentary seated position to active engagement with a space and drawings. Being amongst this information presents opportunity for random encounters between participants and impacts the development of the ideation process, (Fig.12). They become physically immersed in the project as opposed to viewing it just from a screen.

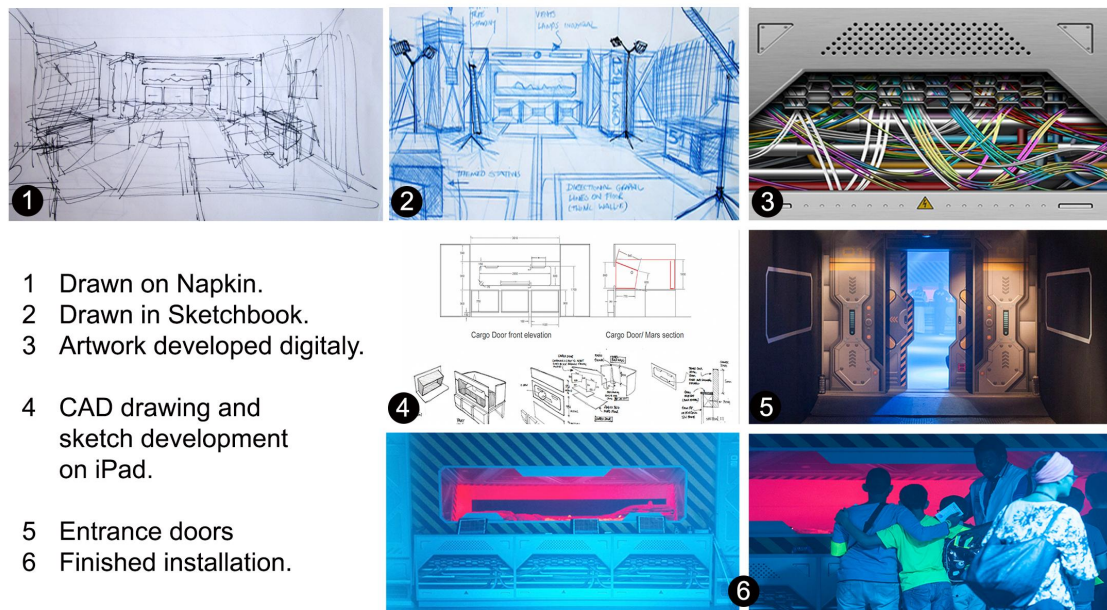


(Fig.12) Work set-out on floor and table for viewing overall concept for Elgin Cathedral Stone Collection Exhibition.

In my practice, I use both digital and analogue as hybrid processes to enhance my workflow. Alternating between these environments engages different thinking processes. It means that both mentally and physically, I can often sustain working for longer periods on a design brief. Shifting between both

spaces creates a varied rhythm to my day and influences where I work from. Sanders and Strappers (2008, pp. 8-18), project that in the future, 'we will be designing in virtual and hybrid domains. We are heading into a world where experience often trumps reality.' They further comment that 'it will eventually become evident that the design research community doesn't need to worry about ownership of spaces on the design research landscape since we will be creating new ones. The new landscapes of design and research will be infinite in space and time and be continually changing.'

My own project production package has developed as a hybrid of CAD, hand-drawing, analogue-digital, photomontage, film and prop-making. I describe this method, which characterised my approach to developing the project, Space Station as a 'montage of information,' (Fig.13). Models and visualisations were created with the client from a 'mash up' of printed visual digital content, audio and hand-drawn illustrations



(Fig.13) Multi-media approach to the ideation process. Space Station project.

2.4 Props and Roleplay

Play and roleplay through prop and model-making to test design concepts is an important part of my process. Design-thinking giant IDEO is a well-known advocate of roleplay and prototyping within the business community. A good example of this can be found at <https://www.youtube.com/watch?v=-SOeMA3DUEs>. The clip explains a concept for Elmo's Monster-maker iPhone app through a combination of quick, rough prototyping and simple filmmaking. Examples of roleplay might be sitting in a chair and drying dishes by a sink to envisage limited mobility or mapping kitchen cabinet locations on a floor using sheets of newspaper. These props are represented by an existing piece of furniture and discarded newspaper. Both are low cost, easy to find, and symbolic of the object they represent. A prop could also be a rigorously manufactured model costing tens of thousands of pounds, representing every detail of the form and function of the finished object. This might be a full-size car interior or a range of motorcycle helmets. In both cases, designers need to create props to aid feedback and evaluation of the design proposals.

Between these two extremes of rough and hyper-real props sit a range of varied approaches to producing physical 3D prototypes. Props convey something about the product form and also illustrate how they may influence the behaviour of the user and interaction with others. This is much like an actor using painted flat scenery to bring a story to life. Keeping with that analogy, a prop affects changes in how we view the actor's character and can help them get into the role. Sato and Salvador (1999, p.3) make useful observation on roleplay within product design, commenting, 'When new or unusual technologies are presented in science-fiction movies, often the audience accepts and understands their function, even when the details of the device are not understood; the movie provides a context that makes the device coherent.'

I developed an innovative practice of prop-making by manipulating drawings to represent 3D design proposals during the early stage of my ideation process. Drawings are produced at the same size as the objects they represent, mounted onto thick cardboard and trimmed to the outline shape of the product. The three projects, 'Camera,' 'Dust Buster' and 'Coffee Grinder' offer examples of drawing employed as props, (Fig.14). The camera project was delivered at the University of Light Industry, Zhengzhou, China. Drawing and props were used to communicate the design intent between Chinese students and UK design lecturers, each of which did not speak each other's language. Dust Buster was a China based project which developed drawings into props to use in photoshoots. The Coffee Grinder project ran as a workshop at Oslo Metropolitan University, which additionally focused on generating and editing ideas quickly.



(Fig.14) Drawings as Props.

The benefits of using drawing as props is that they are quick and inexpensive to produce using low cost materials and tools. Props can be created without the need for a workshop space and the process does not involve machinery. Finished props are light-weight, easy to transport and store (Fig. 15). Further, the props can be edited quickly and manipulated in situ. As the style and realism of the props are not always a prerequisite for the success of the roleplay, participants do not need any specific competency to partake in the model-making. Creating and using simple props encourages participants to 'play' and let go of preconceived ideas about the objects and communities they are designing for. Roleplay can also remove social and professional expectations of those who might be expected to make decisions.



2016
first year product design
card modeling
edinburgh napier university

(Fig.15) Modelling with card.

2.5 Summary

Drawing is my main ideation tool. It captures, curates and delivers instant feedback about the co-design process between participants. I also use it as a visual thinking system for myself to record the process as it happens. I have drawn on successful projects with the Scottish Institute of Enterprise, Historic Scotland and Sand Casting on the Beach to evidence the transformative effect drawing can have on space. These visually enriched environments reflect and impact the collective thinking of all participants in the ideation process. My practice employs objects and places as canvas. Large scale drawings created on a beach, smaller ones on portable, pocket-sized till roll or even scribbled on the back of a hand are legitimate mediums.

My methods demonstrate how I transformed my drawing outputs into props. These then contributed to important roleplay to help participants act out user scenarios which informed the design process. I use a hybridized digital/analogue approach to facilitate workflow that can be either fixed or mobile. This chapter also offers insight into the designer's role in, and future contribution to, the creative industries. It addresses their role as one employed to achieve finished outputs and to facilitate and empower others to do so. I agree with Sanders and Stappers (2008) who affirm that designers will be key in the development of future tools and processes for design-thinking. They assert the designer will be instrumental in making tools for non-designers to convey creative ideas. I believe the designer's role is to act as a catalyst to bring communities together and encourage innovation. I see my role as a designer less as an expert in one field but rather as a 'specialist generalist' who employs communication, design-thinking and visualisation skills to facilitate change in the early stages of the ideation process.

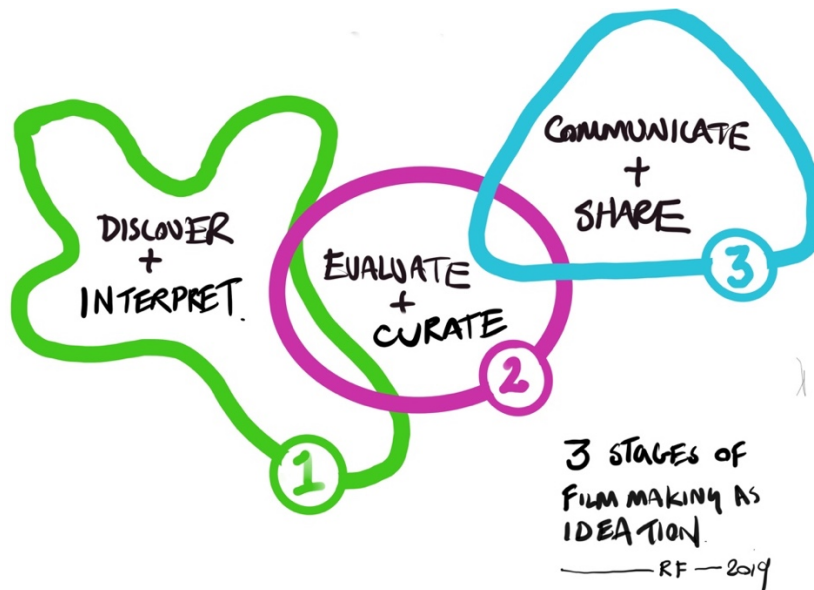
3. Chapter 2: Moving Image

In this chapter I describe how I have developed and integrated the practice of creating moving images to curate and give context to my design process. I define moving image as a manipulation of audio, graphic, illustrative or live action content. Processed either digitally or by analogue, information is revealed to the audience through time-based, changing content. This might range from abstract representations of concepts to captured real-life experiences. I have appropriated knowledge from the film and TV industry and applied it to my design pedagogy and professional practice. It helps me to relate stories about products, environments and users. This filmic production process is integrated within the Work on the Move method to develop relationships between its community of users. This chapter also demonstrates how I use moving image and storytelling to facilitate internationally-based design workshops between different cultures, languages and customs. The success of my ideation method relies on its ability to document, process and organise data that can be effectively shared with its intended audience. This process has been made more effective through developments in mobile technology and software, such as smartphones and tablets.

My 'Immersive Mobile Ideation Method' charts how effective the moving image medium has been in supporting the documentation and communication of my design process. It is organised into three stages.

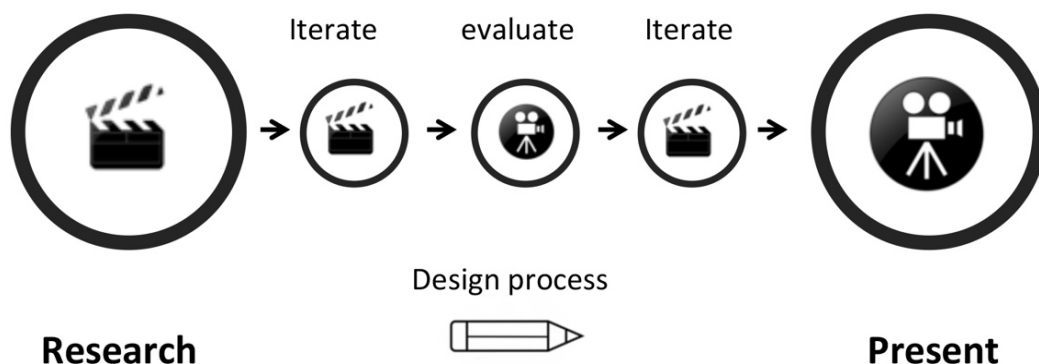
- 1) Discover and Interpret.
- 2) Curate and Evaluate.
- 3) Communicate and Share.

Each of the above are connected through film used as a continuous feedback loop, to record, review, edit, present and archive content. (Fig.16).



(Fig.16) Moving Image Ideation Method.

Norwegian artist and design researcher, Vibeke Sjøvoll, (2014, pp.105-110), maintains that 'in product design, video has mostly been seen as a tool for the presentation of concepts or finished objects, as an instructional tool, or in user observation and research.' I work with film as an ideation tool to feedback and evaluate progress during the design process. In this context, I refocus the use of filmic medium beyond its application to present just the finished outcome of a design process. This is illustrated in the following diagram where the design process is informed by filmmaking. (Fig. 17)



(Fig.17) Use of film in my ideation process.

In my paper, 'Using Moving Image to Facilitate Storytelling and Ideation' (Appendix 2). I consolidate my research with case studies. Gillian Rose (2012, p.406) offers the following about working with moving images which aligns with my approach. 'Photographic media (still or moving) is used because it is particularly good at carrying or evoking three things: information, affect and reflection.' DeLyser et al (2009) contribute to this discussion by describing photographs as a more transparent representation of the life experiences of participants in a study.

3.1 Storytelling.

My portfolio contains projects that have employed moving image to capture, curate and communicate my design intent to co-workers, clients, contractors and end-users. My design process delivers factual and analytical outputs conveyed through engaging short filmic storylines (often under one minute). This provides a broader context, atmosphere and emotional empathy to the design outputs. David Kelly, founder and chairperson of IDEO, tells us that 'stories persuade in a way that facts, reports, and market trends seldom do, because stories make an emotional connection' (Kelley T, Littman J, 2006). My storytelling methods help the designer to gain further understanding of the context of a project and its users. This collegiate dynamic between design teams and their clientele is achieved through the creation and presentation of the films they produce. This is a good example of how moving image is deployed within my practice. Science-fiction and improvisational theatre have also influenced the development of my ideation methods.

Science-fiction films have a long tradition of presenting potential future technologies and environments to audiences. Unsurprisingly, many movie-production designers hail from a product design and architectural background. This includes American product designer Syd Mead, art director for *Blade Runner* (1982), Dan Weil, production designer for *The Fifth Element* (1997) and Alex McDowell, design-lead for *Minority Report* (2002). Each of these films

interpret post-apocalyptic worlds and pay close attention to the design of products, environments and services of the future. They both show the aesthetic representation of the designed objects and the context in which they are used. McDowell has said about *Minority Report* that over '100 patents have been issued for ideas first floated in the movie, which is set in Washington DC in the year 2054' (cited in Fairs, 2015). McDowell has said in designing the city infrastructure of the film and considering its social, cultural, political systems, products and technologies, his team 'enabled writers to use the city and its technologies as narrative devices, meaning the city itself influenced the plot of the film,' (cited in Fairs, 2015). Moving image within my own design ideation practice has the same goal. Sato and Salvador (1999, p.3) say:

'the new product is a prop in a larger story. When new or unusual technologies are presented in science-fiction movies, often the audience accepts and understands their function, even when the details of the device are not understood; the movie provides a context that makes the device coherent.'

These film examples show the genre of science-fiction is an enabler to introduce new ideas to an audience. The concept of 'product-as-prop' can also be used beyond film in the context of live theatre and roleplay to the same effect. Sato and Salvador (1999, p.3) discuss how improvisational theatre can help participants explore new product possibilities, saying they 'create strong shared contexts in which the focus is on interaction, because it is less literal than videos or prototypes.'

My project Juice and Go provides a good example of the use of props developed from drawings. This project informed my 2015 workshop delivered at Oslo-Met University in Norway to a cohort of third-year product design students. The brief asked them to consider product design concepts encouraging people to drink fresh juice. Their solutions needed to be presented as short (under one minute) films that employed drawings as visual

props. One film they came up with, Juice and Go, (Fig.18) offers a terrific example of drawing being used for the purpose of both prop and scenic environment. Producing the film also requires the students to tell and act-out a story to inform the viewer.



Juice and Go



(Fig. 18) Juice and Go: Selected stills from film.

I have used this example often to introduce other international workshops. The film clearly conveys its message across culturally diverse audiences. It has been shown at higher education design institutes in China, Russia, France, the Netherlands and Germany.

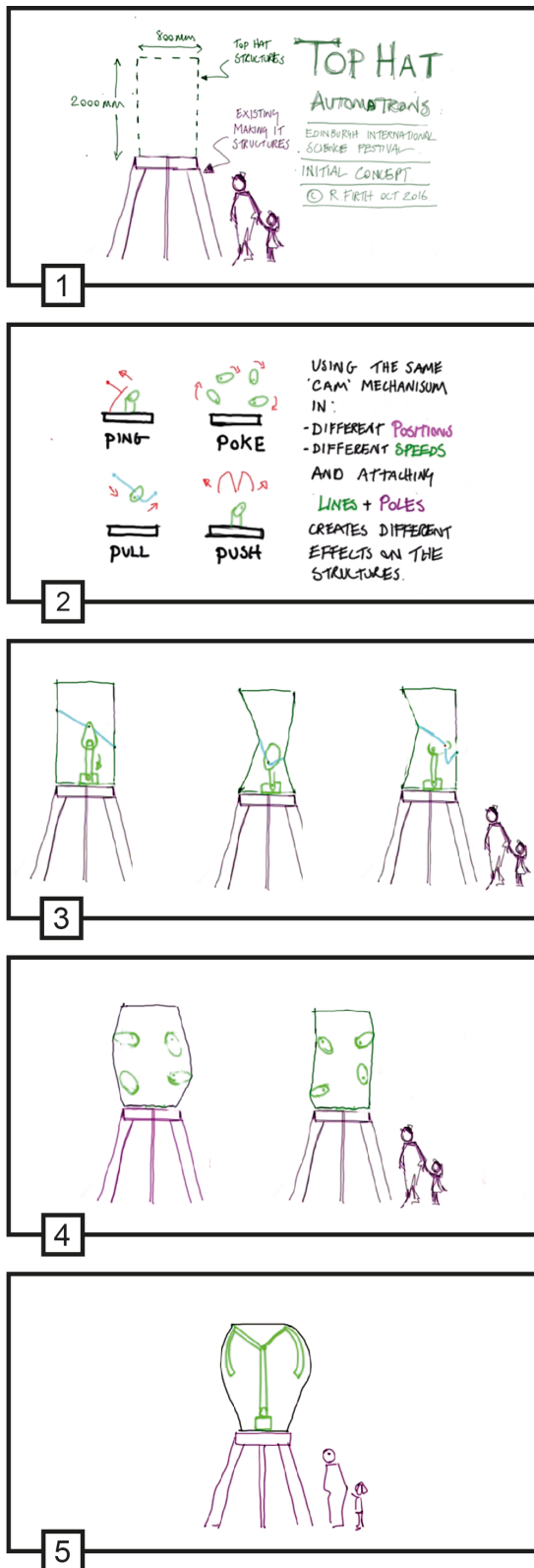
My ideation method integrates improvisational theatre to build community between its participants, prop-making to represent products, storytelling to give context and accessible filmmaking technologies to capture, curate and share content. These techniques are consolidated in my design project 'Aircraft Loo.' Participants worked in teams of five to design and build a full-size toilet cubicle for a commercial aircraft using only cardboard. Each team member roleplayed a different user profile to inform the development of, and interaction with, their finished design. User profiles represented the visually impaired, a parent with a baby, a wheelchair user, a paranoid flyer, a Sumo wrestler etc. Participants then produced and completed a short film describing their design journey. The project was a collaboration between product design and interior design students at Edinburgh Napier University (2015) (Fig.19), and I further developed and delivered this to international design students during International Design Week at Ecole Nantes, France (2016).



(Fig. 19) Aircraft Toilet: Team roleplay

My project 'Play On,' Kinetic Sculpture (Fig.20) commissioned by the Edinburgh International Science Festival employed moving image to communicate my design intent. It conveyed my concepts to both clients (including internal department heads) and building contractors. Each needed different information about my proposal.

I needed to communicate the design of four separate kinetic art installations. The footprint of each installation measured 1 metre x 1 metre x 3 metres in height. The installations were to be mounted on top of a series of 'pop up' display structures that I had designed for the same client in 2017 in 'Making It,' displayed in the Museum of Scotland and internationally (see portfolio page 9). The proposal needed to consider how lighting, graphics, video projection and audio might be integrated into each sculpture. My hand-drawn animation illustrated how the internal mechanisms worked and their relationship with the external appearances of the sculptures. The animations were supported by a soundtrack that reflected the personalities of each installation. They were produced on a mobile drawing tablet, which (as highlighted in my drawing chapter), meant I could work from various locations, including my studio, client office, building contractor workshop and the museum. Art direction for the animation used simple line drawings taken directly from my initial hand-drawn sketches. This did away with the need to redraw, embellish or polish the finished artwork. In this sense, I was developing an animated sketch to convey my initial design intent; my workflow was quick and efficient. The film provided an inclusive approach to communicating my design to all stakeholders, even those without design or engineering backgrounds or experienced in reading technical drawings. Stakeholders were able to buy into and comment on the overall concept without needing to consider, at this stage, refinements to the design details.



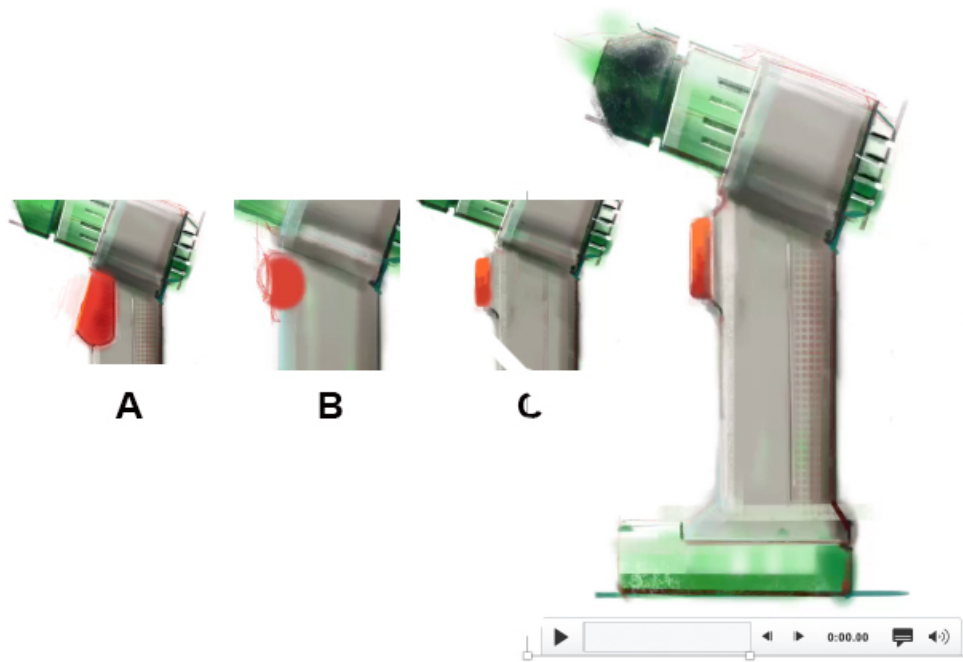
Kinetic Sculpture

Pages

(Fig.20) Play On: Selected stills from film.

Creating stories through filmmaking is the method I use to build a team dynamic among all participants as they develop their design solutions. Here, I am taking existing knowledge from one industry and applying it as a novel method to develop the ideation process in a different design context. Some of the skill sets needed to produce a film range from writing, storyboarding, sound and lighting design, prop-building, scouting for locations, directing and acting. Post-production involves further skills. These diverse roles afford each team member different responsibilities and levels of autonomy within the collective output of the project. During the process, I watch participants self-select skill sets they are comfortable with, building confidence in themselves and the team and creating a greater sense of ownership and pride in the finished product. 'Through this, work becomes a collaborative enterprise where individual skills are developed which complement rather than rival each other,' (Adams, et al, 2013). Put simply, I use the act of producing narratives around a design solution as a tool to develop the design process.

Filmmaking acts as a tool of self-reflection when I am working on my own. I often record my workflow on screen, then play it back to myself. This allows me to look at my work objectively and to shift from being creator and author of an idea to observer and reviewer. The following illustration shows screenshots of a range of trigger button details I was considering whilst redesigning a hand-held drill (Fig.21). This very early design exploration was completed on an iPad during a plane journey between Scotland and China.



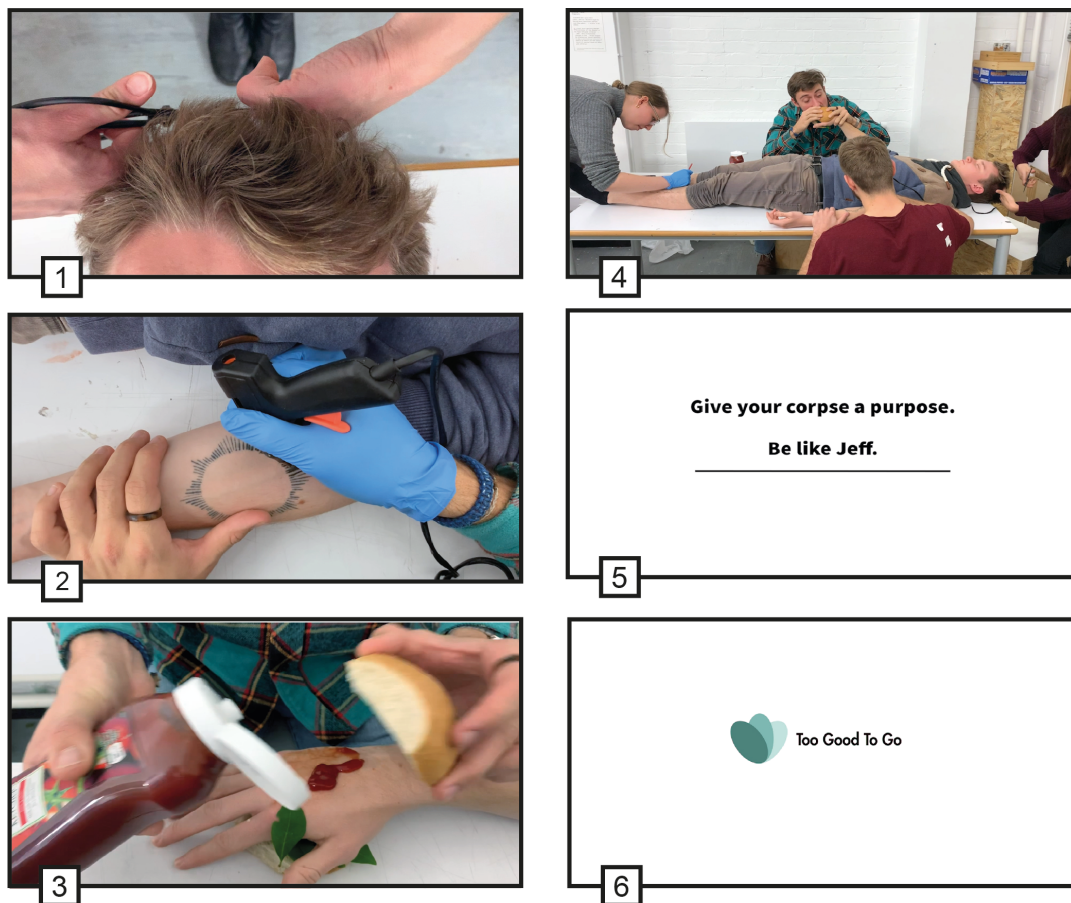
(Fig.21) Screenshots capturing ideation around switch options.

I regard this self-reflection as akin to having a digital bedfellow or sounding board. The functionality, accessibility and mobility of my iPad, allows me to engage with the review process anywhere and at any time. This might seem common practice today but when I started using this workflow process it was a new application with emerging technology.

3.2 Playfulness and Humour.

The playfulness and humour of this filmic ideation process is infectious. Users and audience have commented on the inclusiveness of this method which helps them relate to the project and team. Edward de Bono suggests that creativity is based on the same process as humour and is a significant behaviour of the human mind. 'Humour can only occur in self-organising information systems which settle down in one stable state and then suddenly reconfigure into another,' De Bono (1992, p. 61). He discusses the sequences of experiences that set up patterns of perception and conditions that he labels 'side-patterns' which we are unable to access merely through linear thinking. Creating situations which can help us switch across patterns is the basis of lateral or sideways thinking. He suggests that when we have access to side

patterns, we have either humour or creativity. My moving image processes have been effective tools to encourage roleplay, improvisation and experimentation. Real-life or imagined scenarios are acted-out within the filmmaking process which may include abstract constructs built from props. This is exemplified in the film *Too Good To Go* (Fig.22). This was the result of an ideation workshop in Edinburgh with students from Strasczeg Centre for Entrepreneurship, Munich, 2018. They developed business concepts inspired by Edinburgh's historic underground streets and caves. Inspired by stories of the city's 19th century resurrection men (grave robbers), one proposal offered a service for reusing the recently deceased.



Too good to go



(Fig.22). *Too Good To Go*: Selected stills from film.

The Dutch management scholar Manfred FR,Kets de Vries (1980, p. 27) suggests the reintroduction of play into the workplace could be the 'antithesis of rigidity in behaviour, and stops people getting stuck into the dysfunctional behaviour patterns in organizations.' Key objectives of Work on the Move include play, experimentation and adaptability. Cultural historian Johan Huizinga advocates play in the workplace. In his book *Homo Luddens* (2016, 2nd edition) he discusses the reunion of control, fate and environment through tools (*homo faber*) with play (*homo luddens*). My collaborative practice with others facilitates flexible thinking through play and object. Participants feel more relaxed around each other leading to openness and a shift away from hierarchical relationships.

Within my commercial practice I often use a short one-minute film to introduce a design concept to a client. I find it valuable to share the finished filmic output with my audience. This works as an icebreaker when meeting a new client and provides a space in which we can ease into the meeting with the film as a focal point. Creating the short film gives me confidence and prepares me ahead of meeting the client. Instead of worrying about how I am going to start our meeting, I simply press play and begin. During the screening of the film I observe the client's reactions, which proves useful feedback before we start our main conversation. I have integrated the production of short films into my pedagogic practice as design workshops within the BDes (Hons) Product Design programme at Edinburgh Napier University. Students comment that introducing their project with a short film has numerous benefits. Through a cycle of play, pause and repeat, they can experiment, edit and review their work before a presentation. The process settles students' nerves if they are anxious about presenting in front of a large group. They have already considered and created their opening pitch, and this instils a confidence that they can deliver without stage fright. The medium of film creates more of an event around student presentation days, building excitement and anticipation within the audience before each screening. As one student explained, 'The nice thing is that you can use it (the film) as many times as you like. I

sometimes see new things about my design that I might not have seen if I had just looked at it once. I like to show the work to my flatmates and family.'

3.3 Moving Image: An International Language.

I first developed moving image as an ideation tool whilst leading international design workshops for non-English speaking students at Zhengzhou University of Light Industry in China in 2007. While some communication was facilitated through translators, most of my direct interaction with students was via drawing, storyboarding and play-acting. This was immediately recorded on smartphones which could then be played back for repeated review between student and tutor. This harnessed the emerging new smartphone phenomena. In the absence of a translator, the students would make hand-gestures to repeat, pause and fast-forward sections of their films to convey their design intent (Fig.23).



(Fig.23) Tutor and Chinese student reviewing work communicating using phone.

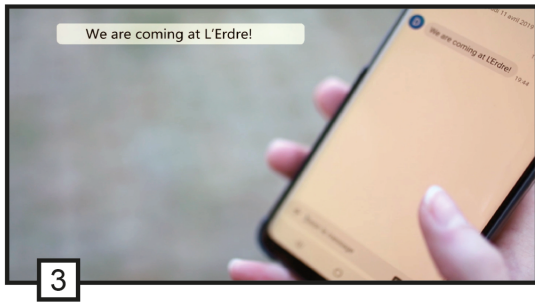
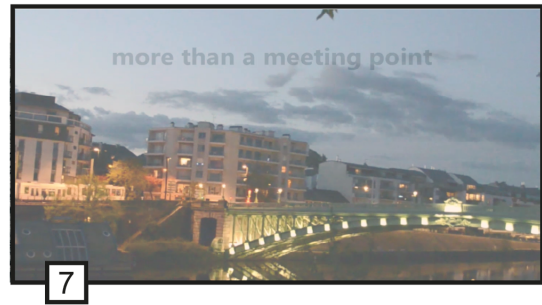
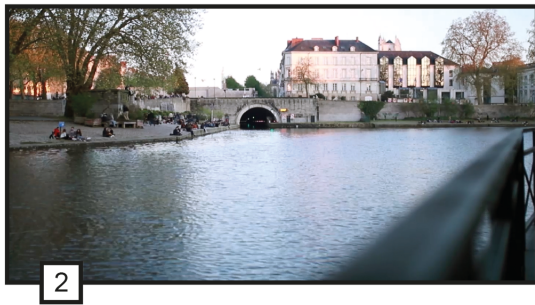
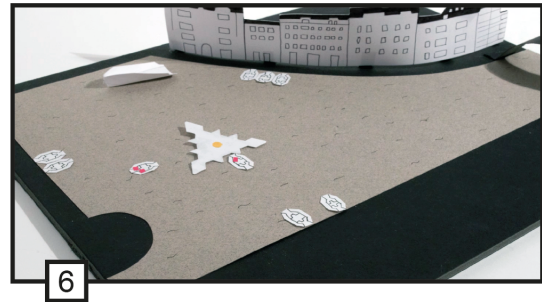
During the design workshops students built an archive of films which became their personal 'moving image sketchbook.' These documented their ideation and feedback processes. Students created a master film from their individual filmic outputs over the project. This was submitted for their final presentation and assessment. Students had the freedom to tell their story their way without being influenced by the tutor over graphic style or presentation. Relinquishing

agency to the students had a powerful impact on their presentations; challenging existing learning, teaching and the pervading assessment culture. Generally, in the Chinese culture of learning students 'do not question accepted norms and ideas in the classroom,' as referenced by Turner (2006). According to Chee (2006), 'the teacher's status and authority as a source of norms is central.' Jin (2006) points to Confucian heritage to suggest that 'Chinese students have a reflector learning style preference, which means that they could take a less active role in learning' ...(and) 'prefer to learn through following the teacher.' The individual art direction of each of the movies revealed both the personalities and the projects of the students to the teacher, enriching the teaching and learning experience. Often the films involved play and humour, creating a relaxed atmosphere when they were finally presented to the rest of the class at the end of the project. This studio dynamic brought confidence and an openness to the group as they discussed one another's projects. Storytelling through filmmaking became our common language. A robust community of practice was built through the shared processes of writing, making, editing and screening.

I have been leading week-long product design workshops annually at L'Ecole de Design Nantes Atlantique, France, since 2015. The workshop attracts students from 80 international design schools, developing the use of drawing as props, ideation through moving image and working from site specific locations. All of these themes consolidate my ongoing research. Students are invited to work from multiple locations in and around the city centre rather than from the more familiar college design studios. Campus facilities often mirror the studio environments of their home institutes. By removing them from their comfort zones they are encouraged to engage with the communities and environments they are working for. Students often attract curiosity, questions and feedback from their project-specific communities during the workshops. When these experiences are recorded as moving images, they also capture a flavour of the host city as well as the projects documented. This enhances the

filmic outputs which are used as promotional materials by the college to raise their international profile.

'Spotlight' (Fig.24) is a short student film created during the 2019 Nantes International Design Workshop. It embraced all the themes outlined in this thesis, including performance, site-specific location, digital interaction and early sketch development models to convey specific design methods and outcomes. This multi-media approach curated through film consolidates my key ideation methods, engaging people, project, process and place. It supports scrapbook and montage techniques to empower users to tell their story their way. Onedotzero (2004, p.15) tells us that 'the boundaries between animation, motion graphics and digital effects, and their relation to the 'filmed' image are essentially meaningless. The pure film has given way to hybrids of moving image that have influenced other more traditional animation areas and have colonized areas from broadcast design to music videos.'



Spotlight

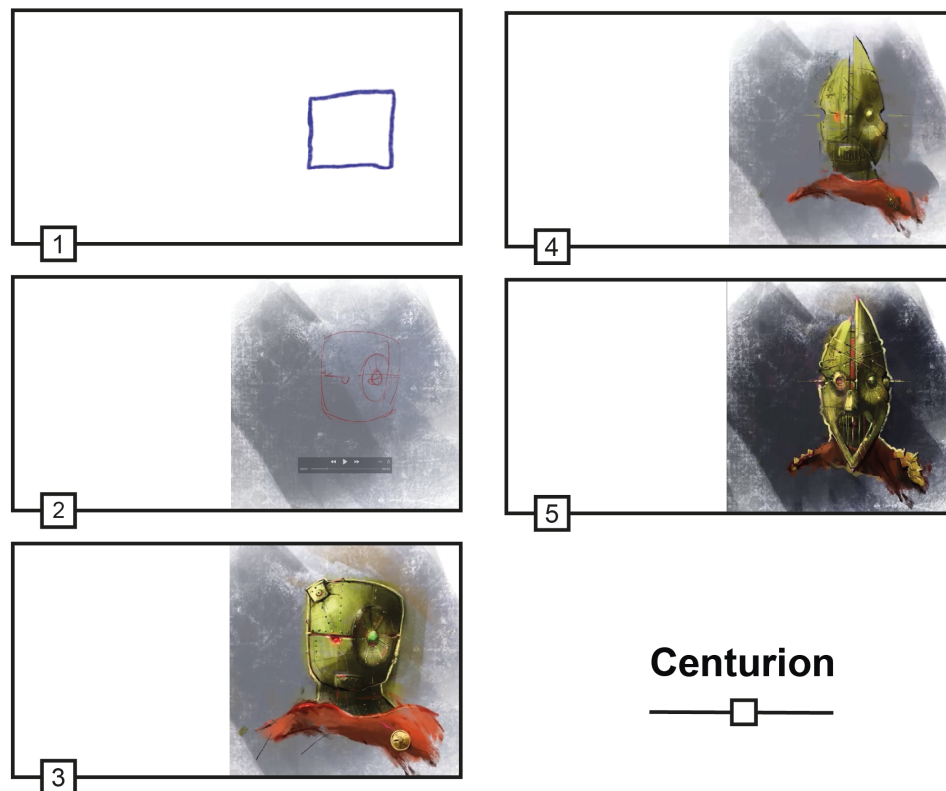


(Fig.24) Spotlight: Selected stills from film.

3.4 Documenting the Process.

In the 2018 film *They'll Love Me When I Am Dead*, the late filmmaker Orson Wells comments; 'The greatest things in movies are divine accidents. My definition of a film director is a man who presides over accidents.' I value the legitimacy of initial sketch ideas and early prototyping to present concepts to clients rather than stealing time from the ideation process to refine the same drawing to the same effect. Just as I like to keep all mark-making and ideas from my drawing sketchbooks, I do the same as I develop moving images. A 'video sketchbook' logs my process. In my digital moving image log, accidental or unused raw footage may reveal insights on subsequent viewing. These may have been missed at the time of shooting the original content. Scenarios and events playing in the background of the main subject of the film can influence unexpected solutions to the problem I am addressing. I never erase the provenance of my ideas either in the analogue drawing or digital moving image realm. It is important for me to witness and retain how the story builds to influence the final output. I recognise that 'new ideas can be stimulated by chance, mistake or accident,' Debono, (1992, p.172). I demonstrate this in my portfolio with the recording of my initial design and illustration for Centurion (Fig.25).

In this example, I started by making marks on the screen without any preconceived ideas and waited for the shapes to suggest possible directions. Consider the game of finding recognised shapes in a fluffy cloud passing over a blue sky. My process is similar, but I am also creating the clouds themselves. Artists use this technique often in the concept art industries. Random shapes are used as starting points to inspire new directions in character, design, technologies and environments. I use this method in product design teaching to challenge students to be more experimental and question preconceived expectations about 'correct' or 'appropriate' ways to work. Students are encouraged to work with risk and embrace failure to achieve successful design outputs.

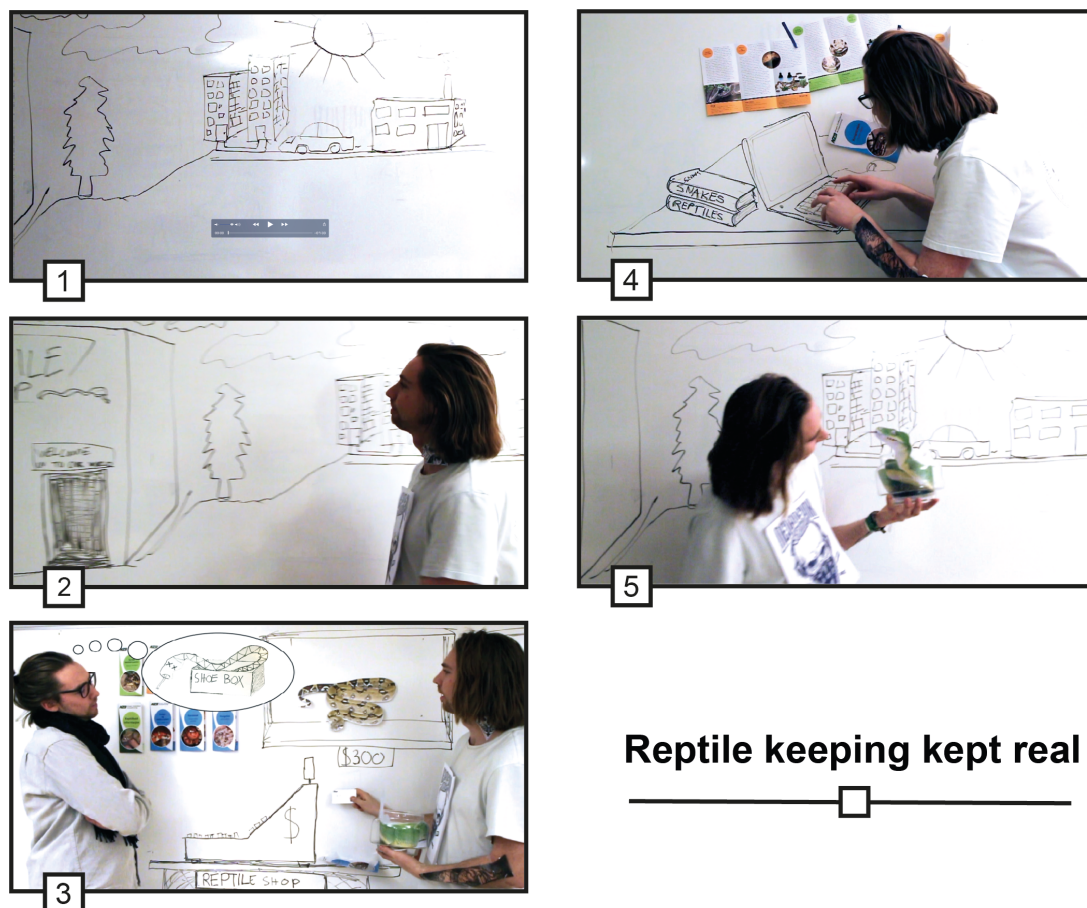


(Fig.25) Centurion: Selected stills from film.

My ideation methods exploit immediate, unedited, processes to capture data, develop it, then communicate design intent. In the early stages I focus on delivering clearly communicated content rather than stylistic, refined art-directed presentations. This approach is useful with users who may be working with a design process for the first time and are insecure about their artistic abilities. Avoiding stylistic parameters allows for the voice of every participant to be heard. This lifts the pressure of having to deliver their concepts in a predefined way. Using film during the beginning of a project can direct users to the wider opportunities and broader context of the design brief. It stops them getting caught up in the finer details of the finished solution which can inhibit creative risk-taking. The filmmaking used in my method demonstrates a contemplative approach to ideation. Edward de Bono offers a description of concepts and their relationship to creativity which I find useful when considering the value of early stage filmmaking.

‘Contrary to our normal thinking, concepts are often more useful when they are blurred/vague/or fuzzy, because then they have more potential. If they are too detailed, they cover too little, on the other hand, if they are too general, they cover too much and provide little direction,’ Debono (1992, p.65)

My workshop Emotional Attachment Object in collaboration with Oslo-Met University in 2019 consolidated this approach. The film title ‘Reptile Keeping Kept Real,’ (Fig.26) shows a service design concept to help people purchase and care for a pet reptile responsibly. The film used simple sketch drawings produced on a white board and paper cut-outs as props plus playful performance to show the concept proposal.



(Fig.26) Reptile Keeping Kept Real: Selected stills from film.

My portfolio draws upon a variety of creative disciplines and my ideation methods have been influenced by cross-disciplinary research and design experience. Storytelling is a theme that runs throughout my practice to communicate my design intent. I use stories to explain the process to my ideation method practitioners. I see literary parallels in Italo Calvino's *Invisible Cities* (1997) in which Marco Polo weaves stories about the people, architecture and spaces of Venice for the Emperor of China. He builds a picture of the city without mentioning its name from fragments of diverse stories, leaving its interpretation to the Emperor. I employ this story in my workshops to illustrate the value of 'fuzzy thinking' and keeping sketchbooks (digital and analogue) that may only show fragments of ideas, in the same way leaving space for the user's imagination.

Calvino (1997, p.147) writes: 'For these ports I could not draw a route on the map or set a date for the landing. At times all I need is a brief glimpse, an opening in the midst of an incongruous landscape, a glint of lights in the fog, the dialogue of two passers-by meeting in the crowd, and I think that, setting out from there, I will put together, piece by piece, the perfect city, made of fragments mixed with the rest of instants separated by intervals, of signals one sends out, not knowing who receives them....

....'But what enhanced for Kublai every event or piece of news reported by his inarticulate informer was the space that remained around it, a void not filled with words. The descriptions of cities Marco Polo visited had this virtue, you could wander through them in thought, become lost, stop and enjoy the cool air, or run off.' (p.32).

3.5 Review, Refine, Refocus, Repeat.

I have taken knowledge from one field (filmmaking) and applied it to another (product design) to progress my ideation method. We have seen how the disciplines of writing, prop-making, performance, illustration and sound production can inform the design process and build a community between creators and their audience. In my paper, 'Using Moving Image to Facilitate Storytelling' (Appendix B), I write, 'it has been said that making a film is done in three steps: first it is written, then filmed and then edited. The advantage of this approach to making is that it gives space for reflection between the various stages of a creative process,' Firth, Stoltonberg (2016). I developed a concept called 'Review, Refine, Refocus, Repeat,' to give structure to the various stages of my ideation feedback loop. Each of these steps offers a different lens to engage with the ideation process and with other parties involved.

By time-limiting my finished film output to between 30 and 90 seconds, I challenge users to be disciplined and to consider what content is relevant to their story. This invites them to create instant impact and to capture and keep the attention of their audience. Participants new to filmmaking comment on how accessible this process is and are often surprised how effectively information can be communicated in a very short time frame. With this process, film becomes a much more efficient way for a design tutor to review, understand and assess student work. In comparison to oral presentations, supported by 2D boards and 3D models, it is much quicker and easier to review groups of up to 35 individual student outputs.

In 1995, Danish filmmakers Lars von Trier and Thomas Vinterberg created the 'Dogma 95 Manifesto' and 'Vow of Chastity,' a set of rules and codes about how to shoot films. They focused on the importance of capturing performances and storylines rather than investing in complex production effects and technology. Inspired by this approach, I produced a range of simple guidelines to help structure the narratives and production of my film methods. I keep my

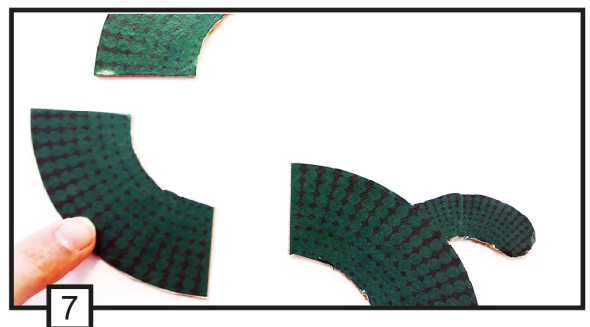
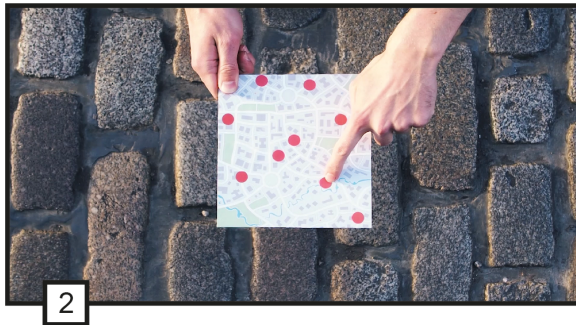
instruction simple so that students can find their own voices and shoot more intuitively.

This leads to films that are unique and individual to them. Here are examples of my guidelines:

- Film must be under 90 seconds.
- It must have a title.
- It must show the problem.
- It must show the solution.
- Consider building a twist into the plot to make the story memorable/unexpected.
- Edit and pace the film to a song or tune that relates to the design issue.
- End the film with an image of the solution.

First-time student filmmakers often believe that production technology is prohibitively expensive and complicated to use. They assume specialist equipment is difficult to access and that filmmaking skills are hard to master. This might have been the case 20-years-ago but the emergence of new mobile technologies (like smartphones and tablets) around 2007 allowed me to experiment, develop and contribute to new knowledge within digital filmmaking and product design. These portable devices supported by software applications, often free to download, continue to develop accessible and intuitive user functionality. Adams, A.J. et al (2013) comment that since technology is so prevalent in young people's lives, it has the potential to be an empowering discipline, in and through which to engage them. This is exemplified in the film *Eat in the City* (Fig 27). This was one output of an ideation workshop in Edinburgh with product design students from the Academy of Fine Arts in Warsaw 2019 and Edinburgh Napier University. They created service design concepts promoting Food Tourism for Edinburgh's local

food producers and sellers. This film demonstrates a process of simple story telling, film production and prop making to create maximum impact. Students were first time filmmakers. My methods enable users to develop narrative and storytelling competencies without the pressure of having to master complicated production and editing processes.



Eat in the City



(Fig 27) Eat in the City: Selected stills from film.

3.6 Summary.

I use moving image as a platform to capture, edit, evaluate and present different stages of my design ideation process. I divide this method into three different stages. The first stage is to capture concept ideas at an early phase of the design process. The second stage is to record the development of the design process which I use for self-reflection and to solicit feedback from others. The third stage is used as a finish presentation medium, documenting the journey from concept development to end solution.

Moving image tells stories and contextualises the objects I design. It clarifies the 'who, what and why' I am designing for. De Bono (1996, p.76) tells us 'data only becomes information when it is put into or viewed in a context.'

Developing design concepts through stories requires participants to collaborate using their different skill sets. Editing films challenges them to review, refine or retell their stories. Sharing films with their audience facilitates feedback loops and archives the experiences for future review. Telling these stories through filmmaking humanises products and environments. The emergence of digital storytelling, enabled by mobile technology, has made it easier to 'meaningfully capture participants' lived experiences and share research findings in a highly engaging manner,' (Rieger et al 2018, p.4). My integration of film-making, story-making, storytelling and prop making enabled by the 'then' newly emerging mobile communication technologies 'created new and distinctive hybrid methodologies,' (Stierer, B. and Antoniou, M. 2004).

Using film as a tool to aid ideation has enabled me to integrate play into my process. 'Serious play' as a means to foster creativity in innovation has been argued by Schultz et al (2015). Their toolkit-based model is built through playful action and is subsequently 'given meaning through storytelling' (Sanders & Stappers 2008). I build on these approaches by using the act of making a film as a tool to foster play, experimentation and performance.

My film-making method is further developed through the making and screening of the film as a catalyst to unite communities to develop their ideation practice.

This filmic ideation embodies the concept of co-design and interdisciplinary collaboration. It builds on Kelley and Littmans' (2006) concept of participants in a design process acting as 'cross-pollinators.' The method offers a new tool by which to structure and facilitate an ideation process. Working with moving image creates varied communities of practice, including those responsible for producing the film, the filmmakers themselves and their audience. Film also establishes a communal scenario between the practitioner and their digital self. This is enabled through the self-reflective playback of their recorded actions. Film can speak to an audience of two people around a laptop, many hundreds in a lecture theatre or millions of global viewers through social media channels. It can communicate without the need for text and language. This validates its position as an empowering and accessible medium within international commerce and pedagogic practice.

Moving image allows me to pull together many different creative mediums. In my approach I engage drawing, text, graphics, animation, live action sound and narration. Highly produced content or a quick sketch scribbled on a napkin can convey the narrative of the film. This hybridized approach, drawing on digital and analogue filmmaking processes, contributes to new knowledge by affording users a broader scope and access to any medium they feel comfortable with to share their ideas. This empowers the individual and enriches the collective experience by offering outputs that are unique to each project. My moving image approach is the 'mothership' that captures and curates all of my processes and outputs. It has had a profound impact on the teaching and assessment of undergraduate and postgraduate international design students. It has also contributed to new knowledge in the context of ideation methods at home in my UK institute and in design institutes overseas.

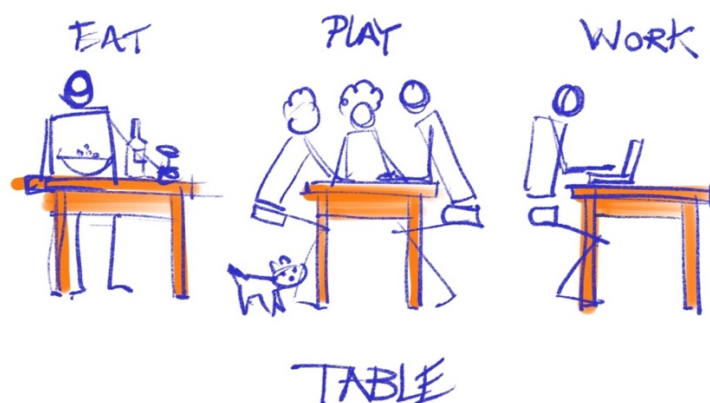
Knowles and Cole (2008, p.33) describe how arts-based methods challenge 'logical positivism and technical rationality as the only acceptable guides to explaining human behaviour and understanding'. I make a new contribution to this argument through my use of filmmaking as an ideation method. A filmic

medium creates a hub that facilitates participant collaboration and co-creation, storytelling and prop making, production and performance. Arnall and Martinussen (2010) describe the use of film making within interaction product design research as 'towards use and activity and away from technical specifications and features,' (p.114). They regard film as a 'meta-medium' from which to practice a design approach. Schön describes filmmaking in design research as central to both reflection-in-action and reflection-on-action (Schön, 1983). Building on this research I develop film as an iterative tool within the design process in a number of ways. I deploy the use of filmmaking in the very early stage of the ideation process integrating it with my 'sketches into props' method and use of mobile phone technology. This generates a feedback loop between sketchbook, prop, story and context facilitated by personal mobile tech. The second development of my filmic ideation method is to shoot with a degree of the un-staged and the unplanned. When filming design outputs in the context of the intended use, it should allow for space around the subject matter to reveal the unexpected or other scenarios playing out in the background. Here the designer's focus is broadened beyond the object and its immediate intent. We observe both the situation and the stories playing out in the margins which may bring new insights to the ideation process.

Timing has been important in my contribution to new knowledge. When I began developing my methods shooting moving images using smartphone devices in 2007, I was preceding current trends mirrored in today's Instagram and vlog cultures. This is particularly true in the context of product design education. Over a 14-year period, my methods have proved usable, repeatable, teachable and impactful. I have been invited to deliver my filmmaking/ideation workshops to internationally based undergraduate and masters' product design programmes. As per earlier references to the work of Gray and Malins (2004), I consider my methods original by virtue of their cross-disciplinary approach and use of different methodologies.

4. Chapter 3: Mobilities

This chapter discusses my interpretation of the concepts of space, location and mobility within the context of my ideation method. It examines their influence on my definition of a workplace and community of practice. Each of these concepts identifies with themes of fluidity of workflow. These include how participants move in and between physical and digital spaces, work in transit and create content through moving image. Again, I highlight the significance of the advent of mobile technologies and their provenance in my contribution to new knowledge. I regard space as environments that can be physical, tacit, digital and emotional. Space can also be defined as a period of time. Locations are spaces that can be either single or multiple venues to work from. Mobility refers to how I might move between space and location. I can be in motion and so too can the environment around me, for example, working from a train. Mobility creates opportunities for random encounters which can enrich the ideation process. It can be meditative and have positive impacts on health and wellbeing. All of these scenarios require a person to activate the identity of the space and place. I demonstrate this concept in my 'Table' illustration below (Fig.28). All of the above themes reference my papers Work on the Move (Appendix 2) and Carousel (Appendix 2).



(Fig.28) Table: Person activates the identity of the space.

4.1 Space and Location.

I define space as a place where I engage with work, which can be physical, digital or mental. It can be a place for one individual to work from or where many people meet to collaborate. James Paul Gee (2004) refers to similar notions of workspace through his definition of an 'affinity space.' He describes this as a location and space where people meet to share knowledge and where learning takes place. Gee's definition is useful to me when I reflect on how I use my own workspace method to foster participatory activities. My ideation processes engage users in common praxis through this approach. They demonstrate that places of learning and teaching can become mobile as participants move between fixed locations, as demonstrated in my projects Sand Casting on the Beach, Work on the Move and Carousel (see Appendix 2 for full papers for all three projects). Working while in motion is a key characteristic of my contribution to new knowledge.

Within my practice I define a physical workspace as a studio, a client's office, a contractor's workshop or the location where the finished project resides. In Work on the Move, I engage with multiple locations for work. These hybridised workspaces stimulate new creative thought patterns for users relating to their specific design projects. Integrating workflow and mobility has a positive impact on well-being, which fosters improved collegiate relationships and in turn impacts the success of projects. The concept of walking meetings has recently gained popularity. Research has shown that workers can be more productive when mobile. This coincides with studies flagging-up health issues associated with sedentary work. Ahtinen, A .et al. (2016) present an illuminating paper on the benefits of walking meetings, mediated using mobile technologies. 'Nowadays, the knowledge work is characterized by hectic workdays, high demands and multi-tasking, often at the cost of the employee's well-being. Walking meetings towards thinking and discussing about the specific topic that is selected to be a target of the walking meeting.'

Sand Casting on the Beach (Appendix 2) demonstrates the impact working in different spaces and in diverse locations has on learning and teaching. This project was an international collaboration between undergraduate product design students from Scotland and Norway. It focused on producing jewellery from pewter casts of models designed from recycled packaging, which were set into the beach. The workshop was delivered in Edinburgh from multiple locations, including a design studio, a model-making workshop, the beach and on a bus in transit between the studio and the seaside location. Students needed to first build their own workspace on the beach, which included bringing all materials and tools to the site. They were responsible for identifying the beach workspace, ensuring it was fit for purpose, ie. safe and for maintaining and operating the site. They built fire-pits in which to smelt the pewter, which was then poured into mould impressions of their designs. These were then pressed into the sand. As the students built their site, it became clear that they were also building their learning community. Redstrom, J (2008, pp. 410-423) tells us that 'learning spaces are primarily configured by defining use through use, rather than defining use through design'. After the workshop had ended the site needed to be restored to its original state and left 'untouched'.

Student learning became physical and experiential, I observed, as they became immersed in their environment, materials and processes. Students fed back that their learning became more meaningful as they physically related to the materials and the making-process. Kolb D. A. (1984, pp.83-85) echoes this in his comments that: 'learning is best facilitated in an environment where there is dialectic tension and conflict between immediate, concrete experience and analytic detachment.' He developed a range of terminology defining his learning spaces. This included 'concrete experience, reflective observation, abstract conceptualism and active experimentation.' I also observed that participants of the workshop were constantly responding to questions from inquisitive members of the public (on the bus and beach). Students took ownership of their learning and the community. These themes of experiential

and tacit learning, outdoor learning spaces and community involvement are key aspects of my Work on the Move paper. In it I acknowledge author Richard Sennett who states in his book *The Craftsman* (2008) that relations between place, making and materials are fluid. This relationship is key to my Work on the Move process as it enables ideation with tools and methods to 'approach the world in order to discern the preconditions of a design' (Nelson and Stolterman 2012, p.120).

Sand Casting on the Beach was presented at the iJade Conference at Glasgow School of Art (2016). This led to an invite to deliver the same workshop to Sixth Form pupils at Bo'ness Academy, (Fig.29). My second year product design students collaborated on the project with the high school pupils. The success of the workshop demonstrated that the sand casting project was repeatable, teachable and could be adapted for different user groups. The project demonstrated that 'a learning space is a change agent, it influences its users and their activities, which in turn have agency as well,' JISC (2006). The following is feedback from an art teacher who participated in the event:

'This workshop has also been brilliant as the knowledge and experience travels not just from Edinburgh Napier product design students to Bo'ness, but also in a wider context through colleagues, who will move on to other schools as their careers develop. Sand Casting on The Beach has broadened our students' outlook on design and career opportunities.'

Manna Dobo: Bo'ness Academy

Whitton (2018) argues that 'playful learning in higher education currently lacks a coherent definition, evidenced pedagogic rationale or framework of implementation approaches.' Sand Casting on the Beach addresses some of these issues by developing a teaching and learning method that takes learning

out of institutional learning spaces. It introduces 'hands on' making and experimentation in a beach location. This environment fosters a playful approach to learning. Perceptions of failure and success become less polarised. This is due, in part, to activities and learning becoming a collaborative community endeavour. Trial and error become transparent, shared and owned by all participants. This builds on Whitton's theories which suggest that playful approaches can provide spaces for learners to be curious, actively participate, enjoy learning activities and be driven by intrinsic motivation, rather than extrinsic, instrumental gains.



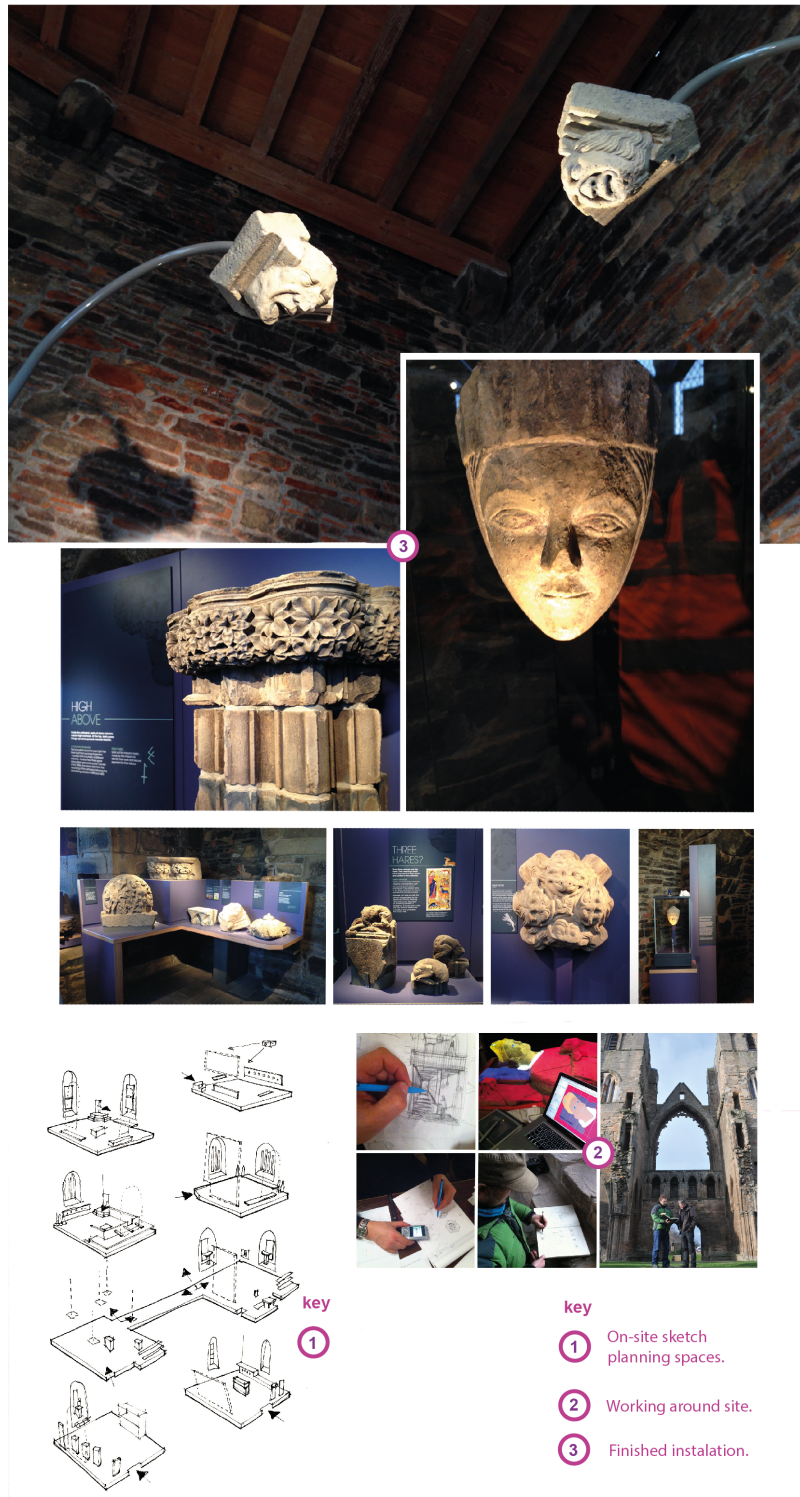
(Fig.29) Sand Casting on the Beach.

Work on the Move exploits tacit knowledge and sensorial experiences like touch, smell and sound stimulation to assist ideation generation, Schön (cited in Sullivan, 2010, p.67, second edition). In the context of my ideation method, tacit knowledge occurs at the 'time of' and 'within' events as they happen. Crawford (2009, p.166) says 'the basic idea of tacit knowledge is that we know more than we can say, and certainly more than we can specify in a formulaic way' and suggests that 'intuitive judgements of complex systems....are sometimes richer than can be captured by any set of algorithms.' These comments help explain that users of my techniques do not need to communicate their ideas through a prescribed or industry specific format. This creates an inclusive, level playing field approach in which participants can contribute to the design process.

During Work on the Move workshops I ask participants to walk through their city, moving between predefined locations as they discuss and develop their ideation process. They are encouraged to embrace the rich sensorial experiences and sometimes random encounters that would not occur in the controlled and predictable space of the studio. In these fluid states of motion, participants are challenged to break out of closed thinking patterns and pursue new idea generation influenced by the external environment. Keynes J.M (1997) aptly describes this common issue with the design process when he says, 'the difficulty lies not so much in developing new ideas as in escaping from old ones.'

Elgin Cathedral project for Historic Scotland (Fig.30) exemplifies my process of working in different spaces to offer new contexts to view, interact and think about a design project. Site visits to the cathedral involved a four-hour train journey each way which allowed me space and time to reflect on the project. In this fluid workspace I was removed from many of the daily distractions and responsibilities of a working day at the studio. This concept of mobility enabled me to work in a 'nomadic' context, drawing on different environments and experiences to aid my workflow. This is similar to Sennett's (2009, p.179)

'craftsman' who 'moves through society responding to hidden and complex orders and materials.' Mobile technologies have allowed me to redefine my workflow. Whilst driving or sitting on a train or plane, I am in a semi-controlled environment that encourages me to self-reflect on my design projects. Solnit (2001, p.21) consolidates this observation about workflow as a 'transitory status bestowing a certain familiarity without the bonds of belonging: a solitary walker is in the world, but apart from it, with the detachment of the traveller rather than the ties of the worker, dweller and member of a group.'



(Fig.30) Elgin Cathedral.

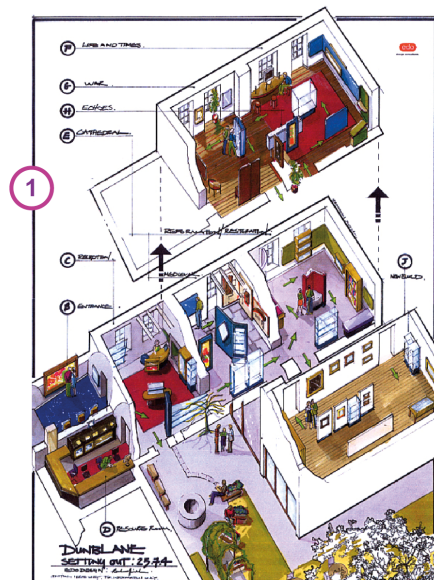
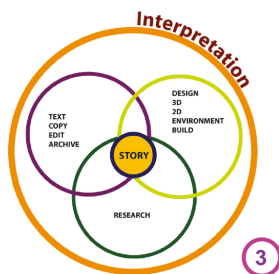
Working in transit brings time parameters to my workflow using a journey's start and finish to dictate the length of time I spend on a task. Cross (2011, p.34) defines such parameters as 'rules of engagement' that provide 'operational limits' within which to refine and improve innovation. I use this 'time sensitive' approach of working as an ideation tool within both my design practice and teaching. Where appropriate, I divide teaching into a series of one-hour tasks which maintain the momentum and variety during the day. This learning environment is dynamic and engaging and keeps both student and lecturer focused. I refer to this teaching method as 'the Power of an Hour' and also use it within Work on the Move workshops to stimulate different thinking patterns and to facilitate mobility and changes in location.

We may view the practitioner as the activator of space. During the design, production and installation of my Dunblane Museum exhibition in 2010 (Fig.31), I worked in a continuous cycle between design studio, production workshop and the museum. I also used the travel time and different modes of transport (bus, car, walk, train) between locations to review and further develop the ideation process. Sennett (2009, p.179) defines this as 'learning becomes local' and discusses how micro-environments can inspire and produce experiences and forms. Working this way demonstrates that the concept of place and space can be defined by the practitioner who initiates action in these locations. Brown (2009, p.84) describes a similar theory. He states that 'the single most powerful tool of design thinking....is not CAD, rapid prototyping, or even offshore manufacturing but that empathic, intuitive, pattern-recognizing, parallel-processing, and neural-networking internet that each of us carries between our ears.' What I take from this is that the practitioner and participants become the catalysts that define and activate their workspace, tools and processes.



Key

- ① Design concept drawings
- ② Finished installation images
- ③ Visual showing my design interpretation process



(Fig.31) Dunblane Museum.

4.2 Digital Tools and Mobility.

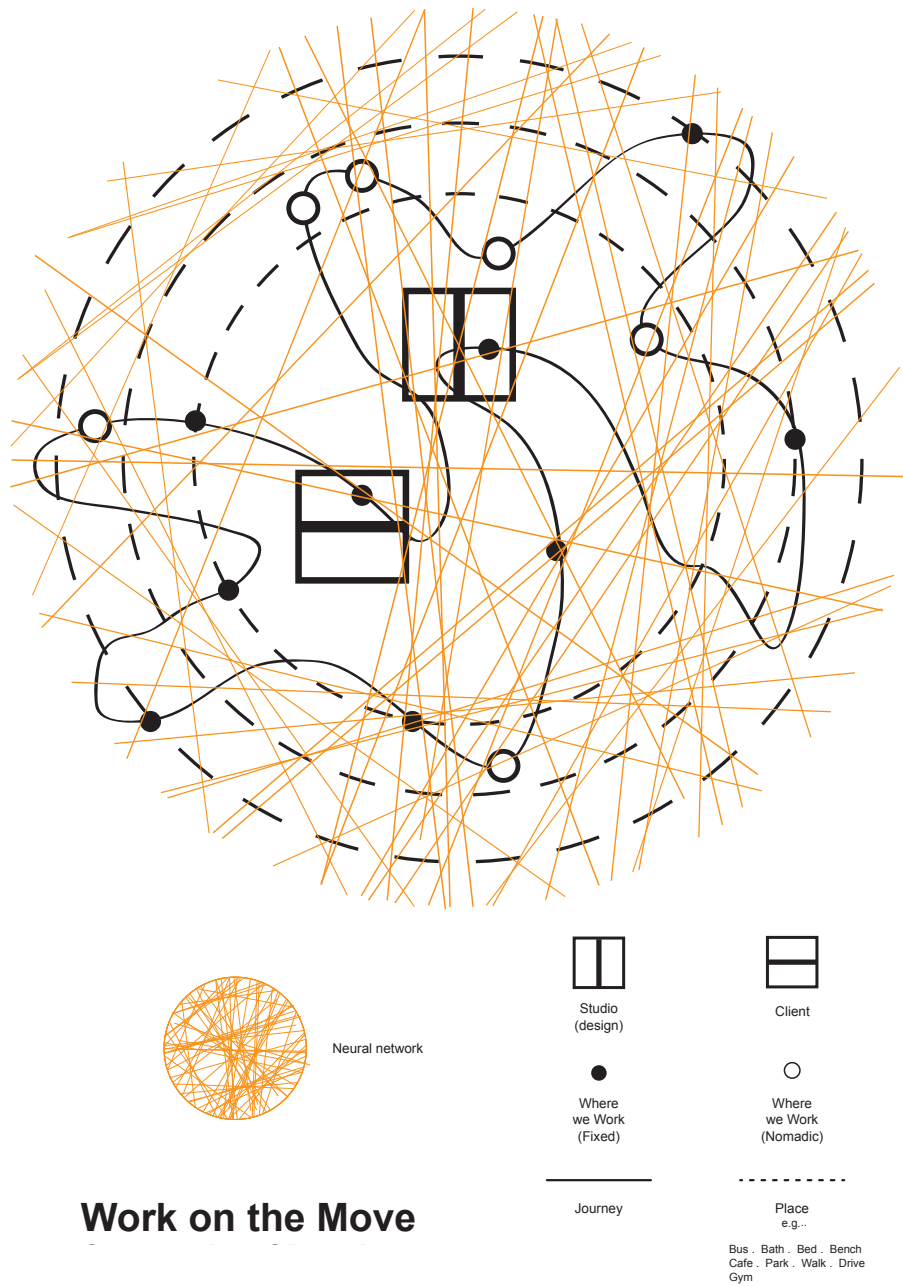
The most profound effect of using digital space and tools in my own ideation process has been the freedom it has afforded my personal mobility. It has enabled me to work from diverse locations without the need to keep returning to a central fixed workspace. This has been beneficial to my productivity, immersing me in the environment and community I am working in. Gibson (1979, p.127) defines a similar condition with his concept of 'affordance.' 'The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill.....it implies the complementarity of the animal and the environment.' Work on the Move is a tool that seeks to gain benefits from a temporary escape from fixed space locations and working times. Muller, A, 2016, suggests that the rise of accessible personal digital technologies, sophisticated software and global information infrastructures has enabled a dramatic increase in digital nomadism, exploiting location-independent living and working styles. Forbes (2017) describes the rise of the digital nomad in part as a desire to escape the 'rat race' of modern life, a dream to live in such a way that provides a withdrawal from '9-to-5 obligations.' In an earlier article the academics comment that those who adhere to this style of life are 'redefining...making a livinga departure from the traditional office environment,' (Forbes 2016). It is further argued by Nash, Jarrah, Sutherland, Philips (2014) that the digital nomad community is a fertile context for information research since it features a changing dynamic between people and information.

My mobile ideation method develops the concept of digital nomads as those who use technology to enable physically meeting and working with each other in a temporary nomadic state. My method does not require digital technology to be a prerequisite for the success of nomadic activities. If required, mobile communication technologies can be used as tools to support, reflect and share content, however, non-virtual /digital interactions, can also be recorded and developed using pen and paper. Users of the method meet and travel for

shorter periods of time and distances than would be expected of the nomad described by Forbes.

Common to all of my projects is the recognition that from the moment a design brief is set, the thinking starts. The car, bus, café and beach have all become workplaces for me. This mode of working in multiple venues has facilitated change in the way I think and pace myself and has had beneficial effects on my mental and physical well-being. It has also resulted in improved personal productivity. Design problems can be resolved with a sketch scribbled on a bedside notepad at 2am, showing that ideation does not have to follow a fixed time frame. Nor does it need to be a linear, fully planned and structured process. Here I am acknowledging that people can work, think and produce in a variety of conditions. This contributes to both my design methodology and insight into new knowledge.

I have recorded this insight into design workflow in the following visual diagram: It visualises my interpretation of the design process from the perspective of the client and the designer's studio spaces. It shows where other locations, fixed and in motion, could be used for ideation. Specifically, it highlights (orange line) that ideation is always occurring in the subconscious of the participant (Fig.32).



(Fig.32) Ideation occurring in the subconscious of the participant.

This working relationship between environment and mobile technologies was demonstrated during my 2012 commission to design the Elgin Stones Exhibition for Historic Scotland at Elgin Cathedral. (Fig 26). The ideation process involved immersing myself in the dramatic environment of the 800-

year-old twin towers of the cathedral. Moving around the floors, rooms and external grounds, I employed my hybridized analogue and digital approach to document, inform and record my design ideas. This inspiring location became my studio workspace. During site visits I moved between different locations around the town of Elgin connected to the project. I captured my experiences on camera and through moving image. I sketched, took measurements, recorded conversations with clients, contractors and the design teams. In the evenings from my hotel room and restaurant, I made sense of and refined the hand-drawn sketches and notes made during the day. I did this on my laptop and drawing tablet using software like Photoshop, Illustrator, AutoCAD and iMovie. My outputs were saved digitally to the Cloud, a virtual storage space, and then sent to subcontractors and suppliers throughout the UK for initial quotes or technical advice. I was able to accelerate my ideation process by using emerging smartphone and tablet technologies which built on the efficiency laptops had previously afforded. My workflow speeded-up not least because the technology was so accessible; the devices being both compact and portable. I could refine my data and field notes into production documents ready to send to clients and contractors whilst still on site. This is now common practice amongst designers. Previously, we would have had to wait until we returned to the studio before we could develop such content into refined production information.

The employment of different states of mobility and place to activate a variety of 'mind sets' and approaches to problem-solving has been a dominant theme of my ideation process. In an illuminating paper intriguingly dubbed *The Wild, The Pub, The Attic and The Workplace*, Leurs and Setola (2004, pp.178-183) outline tools for negotiating a shared vision on creative learning spaces. Their account examines multiple learning spaces to stimulate different stages of learning. During my design contract to deliver a permanent exhibition for Dunblane Museum (Fig.31), I explored these themes. The ideation and production phase involved alternating between two main single workspaces. The first was my studio base in Edinburgh, closer to the client and the design

team. The second was my workshop fabrication space in South Yorkshire, located close to the makers, fabricators and sub-contractors responsible for building the exhibition. My week was split between these locations and traveling the 250 miles between them by car or train.

This gave me a physical and tangible structure in which to compartmentalise the large and complex museum project into smaller tasks. Moving between each location gave me space and time to reflect on the project and plan ahead. A third space was provided by the museum itself, adding a further dimension in terms of space, distance and location. Solnit (2001, p. xiii) refers to 'the time in between,' the time spent walking and meandering, as important to facilitating 'uncluttered time' and to providing relief from screens, earphones and mobiles, which we found a positive influence in the design process. As I moved between each site, I was able to use this 'time in between' to ponder and prepare forthcoming meetings with clients and contractors. Michael Liegl (2014, pp.163 - 183) gives an account of nomadic workers crossing geographical and organisational boundaries whilst navigating different spaces. Many of them have fluid affiliations with larger organizations or are entirely freelance and self-managed. This nomadic principle echoes workflow themes raised earlier in my Space Station (Fig.5) project. Its ideation phase was coordinated internationally, over three time zones. The client was based in Scotland, build and installation contractors were located in both Scotland and the Middle East and I was working from mainland Europe. Once again, a fixed office location was unnecessary. I often worked from a smartphone, taking calls, reviewing and sending drawings and documents on the move. The immediacy and proximity of the smartphone allowed me to easily manage and navigate communication between different time zones.

4.3 Identity and Digital Self-Reflection.

A key principle of my Work on the Move workshops has been engaging with real-life experiences to influence ideation. The concepts of mobility, identity and role play within the purely digital realm offer further exciting opportunities to develop my methods. My portfolio gives context to how these methods are transferable between different creative realms. The projects Distant Star and The Ship (Fig.33) and Matter Mutts (Fig.34) consider digital communities and practices.



(Fig.33) Distant Star and The Ship.

In 2012, I worked as an art director and concept artist for a Scottish-based digital gaming and entertainment company. The project outputs were entirely digital, and this was a new experience for me. My workflow had typically involved creating real-life structures and objects, fostering human interaction and operating from different physical environments. But this new workspace was purely digital and, in addition, I observed a generation gap between myself and the studio staff of up to 20 years. Here I encountered what Marc Prensky (2001, pp.1-2) identifies as 'digital natives and digital immigrants.' He describes people born into the digital world as 'native speakers of the digital language of computers, video games and the internet,' and dubs 'those of us who were not born into the digital world as digital immigrants.' Writing from the perspective of the present day, the concept of a 'digital immigrant' may soon be redundant. However, issues of workplace and community defined by Snyder and Wenger (cited in Blackmore, 2010) as 'generational encounters' are still relevant. 'Depending on how a community negotiates individuality, the generational encounter can have different effects - as old timers and newcomers fashion their identities in their encounter.' As work becomes more sedentary, desk and screen based, I believe the need for a Work on the Move approach is more relevant than ever. This real-life experiential enterprise, which draws on physical activity, space and location, unites individuals 'invested in histories of practice and in generational politics,' Snyder and Wenger (cited in Blackmore, 2010) and forges new working communities.

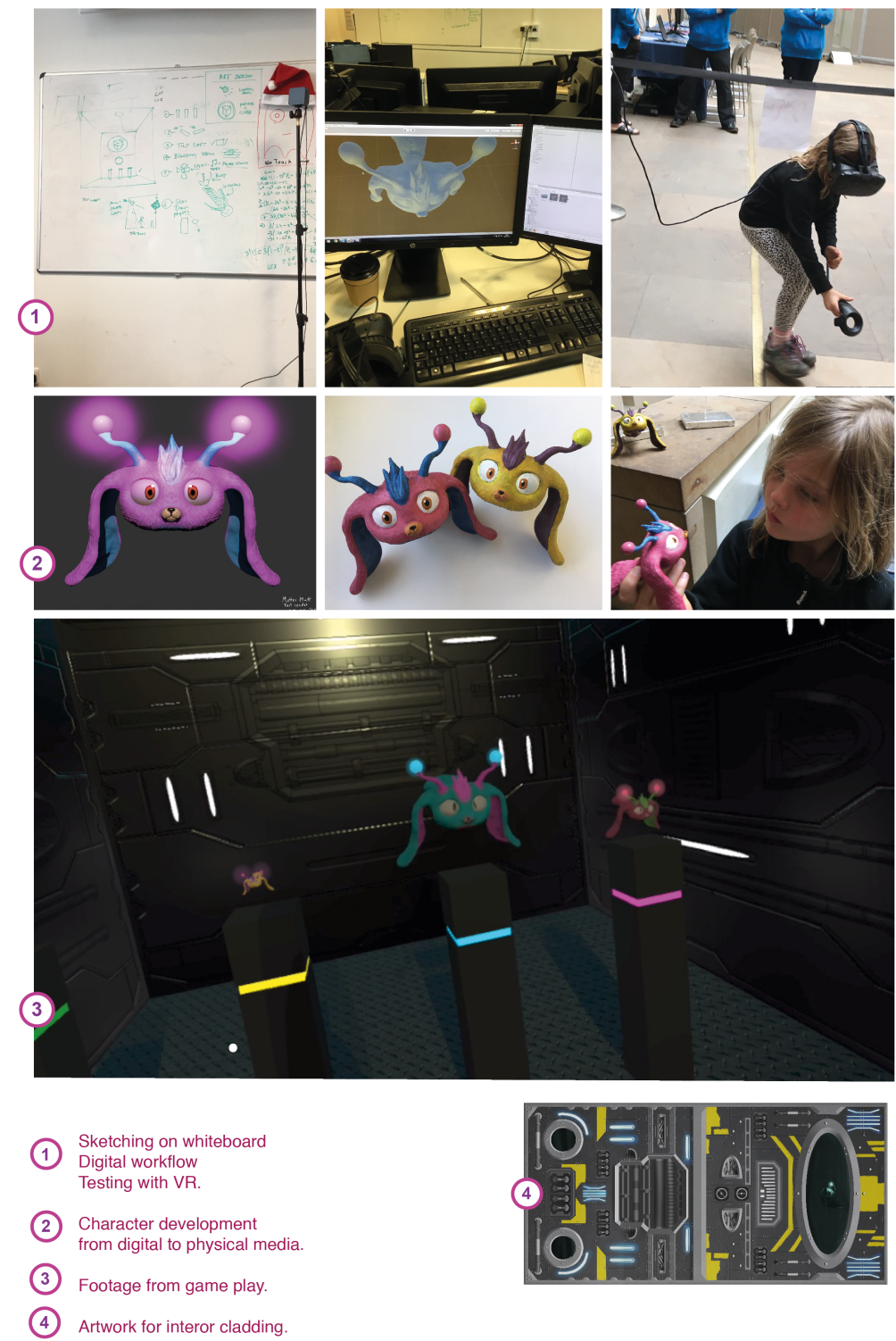
In this digitally led studio most employee interaction, including work, breaks and lunchtimes, was largely mediated via the screen. For example, one colleague would periodically break from work and ride his avatar on a horse across a fantasy landscape (in real time) to a bar. There he would meet the avatar of others based in different locations around the globe. Together, through their avatars, they would collaborate on a range of projects. This community of practice illustrates for me what Bailenson and Beall (2004, pp.1-2) describe as 'common use of avatars during computer-mediated communication.' It shows the impact collaborative virtual environments (CVEs)

have on traditional concepts of human communication. Bailenson and Beall have examined the subject of identity through avatars at work. They have explored a phenomenon called Transformed Social Interaction (TSI), whereby interactants 'can selectively filter and augment the appearance, verbal behaviour, and nonverbal behaviour of their avatars,' (2004, pp.1-2). Whilst virtual collaboration has many virtues, I still observe a need to marry it with real-life encounters, authenticity and transparency. This strengthens my confidence about integrating a Work on the Move method into the evolving workplace.

Work on the Move has evolved a range of tools and methods which collectively can be described as 'an immersive ideation process.' Participants engage in both analogue and digital realms including virtual and augmented reality platforms. In 2016, I collaborated with the school of computing at Edinburgh Napier University on a project that explored the perception and effect of space, time and texture on users of virtual reality systems. This produced an immersive, interactive game called 'Matter Mutts,' (Fig.34) exhibited at the National Museum of Scotland during the Edinburgh International Science Festival the following year. Put simply, the game centred around the protagonist capturing alien-type dogs called Matter Mutts from a space station. Each dog possessed its own transformational power and when captured, these transferred onto the protagonist for a short period of time. For example, the protagonist could change size, slow down or speed up time or jump between different spaces. The project research generated questions around the need for physical or virtual interaction between participants, objects and places.

I have deliberately integrated virtual reality into my ideation process to consider concepts surrounding time and their impact on the evaluation of our projects. I also remained mindful of the concept and implications of mobilities within this virtual arena and the speed with which I could respond and react to feedback. Today, virtual reality systems are commonplace in industry. They

are used for everything from automotive design and manufacturing to assisting surgeons to plan operations and educate patients.



(Fig.34) Matter Mutts.

4.4 Summary.

Work on the Move uses all the definitions of space I describe in this chapter to refine the ideation process in different environments, communities and modalities. My definition of 'environment' includes fixed spaces like the office and workshop or multiple venues like the home, café, park bench or library. In between these static and varied places of work are the spaces in transit such as the plane, bus and train. Walking offers another ideation space. I define workspaces as both physical and digital creative realms. Practitioner and participant are the catalysts that define and activate the workspace whatever the environment. The projects in this portfolio have been developed using mobile and transient environments, aligning Work on the Move with a peripatetic approach to ideation and workflow.

During a car, train or plane journey, my environment is moving but I am not. Against the hum of the engine and gentle presence of motion and vibration I can reflect on the projects in an almost meditative state. I use my time in transit to organise and plan the stages of the projects and allow myself space to contemplate the finished solution. I can limit my communication with others in this semi-public space, which shields me from distraction from tasks or requests inevitable in my studio. My time working in transit is akin to a writer's retreat; a place of focus and contemplation contained within a time frame defined by the duration of the journey. The artist William Kentridge describes how his creative process is influenced by the short walks (3-4 steps) he takes between his canvas and the camera he uses to record his animation process:

"In that physical walk between the drawing and the camera, it's a physical process, not a mental process,....new images and ideas suggest themselves"

<https://www.sfmoma.org/watch/william-kentridge-transformation-with-animation/>

This account confirms my claim that mobility need not be defined by miles and hours. It demonstrates that only a few steps and seconds may be needed to provide space to reflect, decide and act in the context of a creative process. Work on the Move builds on this argument. The method is scalable in terms of both distance and time; it allows for both individual self-reflection or group discussion.

Adapting to different work locations has a positive effect on my mental and emotional well-being. Being physically active and experiencing a variety of external influences and random encounters, positively impacts my productivity, focus and health. Being mobile is a welcome counter to sitting at the same screen or workspace and engaging with the same social group each day. Work in transit helps me re-frame, re-focus and reflect upon my ideation process. It continuously revives my energy and engagement with the project. Work on the Move constantly revises the participant's experience of work, as informed by the cycle of place, location and interaction between collaborators. The working environment is fluid, physical movement is fluid and so too are process and interpersonal relationships. This creates momentum and structure to a workflow commonly tethered to one space. My contribution to new knowledge builds on the concept of learning spaces, as the static stages of learning, defined by Klob (1984) and Redstrom (2008). It exploits the idea that the time moving between locations is time to observe, reflect, discuss and ideate.

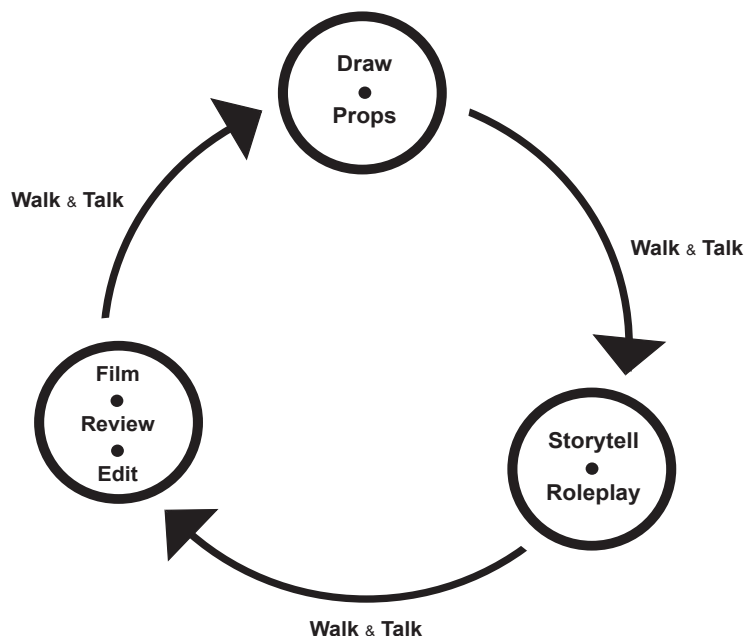
John Dewey advocated democracy and 'promoted processes in which people are empowered to jointly reflect on their practices and experiences, to communicate and cooperate, and to improve their own or other people's situations' (Steen 2013,18-21). The methods used in Work on the Move build on this philosophy by creating a structure in which participants can engage with these processes. The method always incorporates an outdoors setting which aims to diminish institutional tropes of hierarchy that might be associated with attributes such as a title, uniform, desk or office space. Work

on the Move builds on the thinking of Keshavarz & Mazé (2013) who assert that the experts in the design situation are the non-designers, who bring a lived experience or activity - 'a kind of design humanism aimed at reducing domination and forming consensus' (Keshavarz & Mazé 2013).

My mobile ideation method enables a design process that is human-centric and collaborative, adaptive and iterative; a process that diverges and converges in a non-linear and looping pattern (Cross 2001; Buchanan 1992; Friedman 2003).

5. Conclusion

Writing this thesis has given me the opportunity to reflect on my career as both a design practitioner and academic. It has enabled me to make sense of my design processes which both inform and enhance my own practice and those of others. During the self-reflective analysis of my work, I have identified reoccurring themes which have informed the development of my ideation methodology. Individually and collectively, these contribute to new knowledge. My methods have also impacted on and developed a generation of national and international product design students, many of whom have formed their own successful careers in design and education. My themes include drawing, moving image and mobility. In the context of my design and pedagogic praxis they represent what I have termed an 'immersive mobile ideation process,' developing communities of practice and forming the foundation of my design method, Work on the Move. The following diagram presents the processes that inform Work on the Move (Fig.35).



(Fig.35). Processes that inform Work on the Move.

My thesis demonstrates the changing role of the designer. It reflects over the space of a decade a shift between creating tactile, physical objects to facilitating strategic thinking processes. My methods contribute to new knowledge in parallel with 'design thinking' systems developed by agencies like IDEO and Stanford University. This is exemplified in the use of moving image as an ideation tool. Working whilst on the move between different locations associated with specific problem-solving tasks further illustrates original and novel thinking. I have developed a drawing and prop-making hybrid method to capture, curate and communicate content generated by participants of this creative process. The integration of storytelling as a further ideation tool connects these themes.

5.1 New Ideation Methods.

My work is focused on generating new ideation methods to simplify decision-making and managerial hierarchies during the design process. Developing a 'transparency of process' between stakeholder - client, designer, manufacturer – my methods have improved working relationships, leading to better project outcomes. The four definitions by which my thesis can be considered original with reference to the work of Carol Gray and Julian Malins (2004) are highlighted below and cross referenced to specific examples described within:

- It is cross-disciplinary and uses different methodologies.
- It tests existing knowledge in an original way.
- It brings new evidence to bear on an old issue.
- It continues a previously original piece of work.

5.2 Moving Image.

My use of filmmaking as an ideation method to feedback, evaluate and progress the design process demonstrates **a cross-disciplinary application**

of process and method. The use of moving image to facilitate storytelling and ideation integrates different methodologies from different fields. Examples of these outputs are shown in the film projects represented in (Fig.18) Juice and Go, (Fig.22) Too Good To Go, (Fig. 24) Spotlight, (Fig.26) Reptile Keeping Kept Real and (Fig.27) Eat in the City. I demonstrate that moving image processes are effective tools to encourage roleplay, improvisation and experimentation within the context of product design pedagogy. Creating stories through filmmaking is a method I have adapted to build a team dynamic amongst all participants to help them develop design solutions for specific problems (Appendix B: Using Moving Image to Facilitate Storytelling and Ideation). I use the method of creating and acting out narratives in conjunction with manipulating drawings into props to aid role play to develop the design process. This is communicated through filmic outputs and demonstrates the testing of existing knowledge in an original way.

Moving image helps make sense of and gives context to experiences, data and ideas in the early phase of the design process. I use it to build narratives to give context to problems and to illustrate their development and resolution. It allows me to record, interpret, discuss and present ideas. Filmmaking lends to a contemplative approach to ideation, directing users to consider the broader context of the design brief. It stops them fixating on the finer details of the finished solution at an early stage of a project which can sometimes inhibit creative risk-taking. Moving image is a medium which holds all other mediums and empowers users to tell their story their own way. Examples of its versatility include recording and saving sketches and images from scrapbooks and storing sights and sounds from real life. It can also capture action and effects from the digital realm.

Filmmaking allows me to review my thinking from a different perspective than the static images made in my sketchbook. It reveals the entire thinking journey, charting the 'time in-between' as well as the mere snapshots of the key ideation moments. This is what I term the 'scars of my thinking'. It is also

valuable for capturing the sound and atmosphere of the project. I use film to encourage collaboration between creator and audience. A successful film production draws on many different skill sets. It engages participants in different roles and responsibilities, allowing everyone to contribute to its creation. The process of building the film builds the community who created it. This is fundamental to the aim and philosophy of my design methods and Work on the Move. Nurturing a community creates a transparency of process and ideas. It encourages a renegotiation of an individual's status within the hierarchy of the project. This is important to establish from the start so that it does not overshadow collective contribution. For more than a decade I have been invited to deliver my filmmaking ideation workshops to undergraduate and masters design programmes in China, The Netherlands, France, Germany and Scandinavia. My methods have proved usable, repeatable, teachable and impactful. Informing my design process through filmmaking has consolidated my key ideation methods; engaging people, project, process and place.

5.3 Mobile Technologies.

The emergence of the iPad and advances in smartphone technology circa 2007 enabled me to **test existing knowledge in an original way**. In this context, I experimented with new digital drawing mediums and filmic production techniques. Specifically, I focused on the hyper mobility of this new hardware and the accessible and affordable creative software packages it supported. I demonstrate how I integrate these into both my international pedagogic work and professional projects to aid the ideation of the design process. See Projects (Fig. 5) Space Station, (Fig. 10) Do Not Press Undo and (Fig. 30) Elgin Cathedral.

I bring new evidence to bear on an old issue through the projects umbrellaed as Do not Press Undo (Fig.10). In these projects I look at the legacy of the sketches and ideas produced in the margins of the 'sketchbook'. What do we keep, revisit, use, archive, delete, when we move from drawing on paper to screen?

The peripatetic approach to ideation and workflow outlined in *Work on the Move* was made possible with the advent of mobile technologies, specifically tablets and smartphones, which emerged around 2007. In little over a decade, the once fixed and static workplace was reduced to fit into a coat pocket and travel. Mobile technology swiftly became more user-friendly, powerful and affordable and ultimately revolutionized the workplace. I capitalised on this shift in technology to develop my ideation method. As referenced earlier, I used these new tools to integrate people, place and practice. This shift in technology has also enabled me to integrate my drawing and prop making with my filmmaking methods more effectively. It has enabled users to experiment with storytelling through filmmaking without having to master complicated post-production and editing at a fixed studio space. As our digital realities became more immersive and ubiquitous, I asserted the need for a hybridised approach which exploited both digital and physical realms. *Work on the Move* required participants to engage in real life interactions and look up from their screens from time-to-time. Mobile digital tools also enhanced the interpretation of 'real life' experiences to better inform and communicate design thinking. This enabled the creation of a new set of methods within my design practice which collectively delivered a new immersive ideation process.

5.4 Mobility.

My projects *Work on the Move* and *Carousel* (see Appendix B: for both papers) demonstrate the continuing development of an original piece of work. *Work on the Move* builds on the concept of learning spaces, as the static stages of learning. It exploits the idea that the time moving between locations is time to observe, reflect, discuss and ideate. *Carousel* develops *Work on the Move*'s 'time in between' themes and explores this ideation method through a pedagogic lens. Here practitioner and participant are the catalysts that define and activate the workspace whatever the environment. Taken together these ideation methods also consider the future role of the designer and the relationship with their communities of practice. My methodology instructs participants to discuss design issues on the move between various

environments. As an alternative to collaborating inside a conventional fixed studio space, where institutional timekeeping patterns and formats can dictate the day, I encourage them to talk about projects whilst walking outside. Random encounters in the outdoors by their nature can inspire original thought and interaction between others that can influence the direction of the design process. The value of these encounters can remind us to avoid 'designing out the unexpected' when looking for direction for a design solution. This use of varied states of mobility and place to activate different mindsets and approaches to problem solving is a dominant theme throughout this thesis. My method redefines and validates work as more than a set of rigid rules and parameters and allows for flexibility in how we negotiate relationships and the working day. Work on the Move constantly revises the experience of work as informed by the cycle of place, location and interaction between collaborators. Worker, environment, process and relationships are all in a fluid state. My contribution to new knowledge exploits the idea that time in transit can be meaningfully employed to observe, reflect, discuss and ideate.

5.5 Drawing.

Drawing is the prime medium underwriting the communication of my ideation methods. It captures thinking as it happens between myself and clients. It is also a valuable tool for facilitating communication between others. My methods employ initial rough sketches rather than refined and polished drawings in a pre-prescribed format that can take much longer to produce. This is important when working with participants of my process who may not be trained or skilled in communicating through drawing. Using this approach, they quickly discover their authentic voices, allowing the content of their ideas to triumph over mere stylistic representations of them. Rough sketches serve to reveal the unique style and identity of the author, building confidence and empowering them to generate more ideas.

Stamp It (Fig. 7) **brings new evidence to bear on an old issue.** It addresses the issue of how to give feedback, assessment and chart the progress of the design process within the creative industries. Stamp It creates and represents a marked point in time where learning takes place. It builds on Jungk's observation (cited in Sanders and Strappers, 2008) that 'participation at the moment of idea generation is critical if we want our participants to engage in a level of co-design/co-creation with their designers.' Stamp It invites participants to engage and reflect on their own assessment and learning throughout their projects. The Scottish Qualifications Authority are now considering developing Stamp It into a learning, teaching and assessment method. This would be included in the National Progression Award to be used to assess creativity in-line with Skills Development Scotland.

I deploy a work-flow method I have called the 'Power of an Hour' (Fig. 2), which distils full-day workshops into a series of 60-minute tasks. This method means that participants are only ever an hour away from engaging in an activity they like, dislike or are challenged by. This brings momentum to a workshop, avoiding 'paralysis by analysis' when considering ideas and the day's outcome. I use sketches to alter the physical and psychological environment in which they are created. Displaying drawings on the walls, floors and furniture of a space immerses participants in their design process. Drawings are curated as the thinking happens. This approach has also been developed to work in transit and at multiple locations, simply by drawing on a linear roll of paper which travels with the participants, recording and displaying thinking as it occurs (Fig.9). I have also developed a method of translating drawings into props for filmmaking (Fig.14). They are used in still and moving image productions to help role play a design intent. Props can be easily edited in situ by drawing over the originals or cut and manipulated with a scalpel. The process is simple to master and tools and materials are inexpensive

Being a professional designer has been an all-consuming affair for me, often blurring the boundaries between professional and social life. Methods developed through Work on the Move have aimed to identify, address and resolve some challenges around my work/life balance. The concept of time has been a dominant theme throughout my ideation methodology, for example, utilising 'time in-between' whilst traveling to generate, plan and review ideas. I have used filmmaking as a method to tell stories more efficiently and quickly about the products and scenarios I design. Mobile communication technologies have enabled information to be shared anytime and from anywhere. These experiences have all had a regenerative effect on both myself and the participants in terms of energy, focus, productivity and wellbeing.

The impact and success of my methods are recognised both nationally and internationally. For more than a decade, I have been invited to run workshops both at home and overseas in higher education and commercial institutes. These include: the Institute for Sustainable Construction (Scotland), Harvard Business School design graduates, Strasczeg Centre for Entrepreneurship (SCE), Munich University of Applied Sciences, the annual international design workshop at L'École de Design Nantes Atlantique, Edinburgh International Science Festival, the Royal Zoological Society Scotland, Oslo Met University, Windesheim University of Applied Sciences, Zwolle, Netherlands and the Scottish Institute for Enterprise. These methods now drive the programme structure and ethos for the BDes (Hons) product design programme at Edinburgh Napier University.

The publications within my portfolio read as a continuous work in progress. While projects vary, each is united by the application of a common set of design tools to facilitate successful outcomes. Lessons from each project inform the next to assist in the evaluation, development and refinement of my design process. Fluid ideation methods encourage changes in states of thinking amongst participants, breaking rigid-thinking patterns and introducing

simple tools to realise grand ideas and concepts. This represents a sample of professional and pedagogic design practice over a thirty year period. During this period, my job title has changed many times from product and exhibition designer to illustrator and art director. My career, design process and projects have been fluid whilst my fundamental skill set remains the same. As a designer and design educator I have a very broad remit. This has enabled me to be influenced by design experiences across a range of disciplines and industry sectors.

My scope of work has increasingly balanced the role of being a designer, who creates 'physical stuff,' with one of being a practitioner, who facilitates a strategic design process to empower others. Either way, the designer has to be something of an all-rounder conversant in skilled design thinking with artistic, technical and commercial experience to facilitate the ideation process. In the context of my own practice, it would be fitting to describe the designer of the future as an 'immersive mobile curious polymorph.' To consider this role within the broader context of the creative industries... maybe we should go for a walk?

End

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7. Future Research

I submitted my thesis in December 2019. In March 2020, while waiting for my viva, the global Covid pandemic struck. The themes within my thesis - mobile and remote working, communication through screen, blended learning deliveries, filmmaking as a teaching tool - have all now been integrated into common use internationally because of the constraints of Coronavirus. This unique point in our history has allowed me to further reflect on my research themes.

As my thesis progressed my focus changed. Initially it involved reflection on my completed works and lived experiences. Now I am able to consider new starting points for future research themes that interest me. I am continually drawn back to storytelling and how we use it to communicate with each other and as a teaching tool. I am interested in non-written formats of communication that employ moving image and drawing. Digital and human mediated experiences inform research projects surrounding workplace versus wellbeing, and face-to-face versus digital interactions. I am interested in 'mashing up' different techniques, disciplines and communities to enhance design outcomes. As a design educator, I will continue to explore the how, why and what we should be teaching our new designers and the future role of our discipline.

At the time of writing, I have a range of research projects underway. Stamp It has been accepted by a number of higher education and creative industries conferences. The system is also being trialled in some secondary schools in Scotland with an aim to integrate it into the national curriculum. Ongoing research will now focus on how the stamp can be developed for use in digital and virtual environments.

I am also co-leading a collaborative research project with Edinburgh Napier University's Product Design and Biological Life Sciences departments and Maynooth University in Ireland. We are exploring the use of digital storytelling to unite scientists, designers and local communities.

Bridging boundaries between different specialisms and techniques now seems inevitable to me since Covid. I believe that stories and drawings facilitated through moving image and accessed through mobile technology enable a common ground in which to share our knowledge. Informed by my own dyslexia, I am interested in how stories, drawing and other non-written forms of visual literacy may assist other dyslexic thinkers. Opportunities for new research also point at how storytelling might encourage the development of three-dimensional objects and spaces not initially led by materiality and production starting points. This is where I will focus my research.

8. Appendix A: Biographical Information

8.1 Dyslexia and its influence on my practice.

It is important to acknowledge the profound impact my dyslexia has had upon my workflow and ideation methods. Someone once told me there was a reason why art colleges were full of dyslexic thinkers - 'nowhere else would take them.' Whilst I regard this anecdotal statement to be incorrect, I do recognise the point. I am dyslexic and like many of my dyslexic colleagues in the creative industries, find communicating through our particular lens has both advantages and disadvantages. Dyslexic thinking patterns might not always be obvious in the context of art college. This is because creative design work can often be communicated through non-text based visual representation. It could be argued this creative environment might also attract a greater number of like-minded dyslexic thinkers. However, in a commercial context where collaboration is often required between many diverse communicators, it has been my experience that the dyslexic practitioners may find it more challenging to integrate. I have also found my dyslexia can be challenging within more traditional academic institutions which employ standardised administration systems and text-based communications. This reflects my personal experience as an academic.

Neurological research around dyslexia has found links between visual talents and verbal difficulties (West, 2009). West argues that a dyslexic thinker may excel in the ability to get 'the gist or essence of things...multidimensionality of perspective: the ability to see new, unusual, or distant connections; inferential reasoning...the ability to recombine things in novel ways and a general inventiveness; (along with) greater mindfulness and intentionality during tasks that others take for granted.'

West defined a dyslexic mind set as one that had competencies in visual and spatial thinking that include:

- The ability to perceive relationships (analogies, paradoxes, differences).
- A strong memory for personal experiences and an understanding of abstract information related to specific examples.
- The ability to perceive and take advantage of subtle patterns in complex and shifting systems or data sets.
- Three-dimensional spatial reasoning and mechanical ability.

Thomas West (2009).

Such thinking attributes have been categorised into a set of themes called MIND-Strengths by Eide and Eide (2011). These are:

M-Strength: Material Reasoning, **I**-Strength: Interconnected Reasoning, **N**-Strength: Narrative Reasoning, **D**-Strength Dynamic Reasoning

Eide and Eide (2011).

It would be naive of me not to recognise the effect my dyslexia had upon the development of my working praxis and ideation methods. The swiftness with which I can understand a spatial arrangement and communicate it through drawing or model making is matched only by the sluggish manner in which I then annotate it with supporting writing. For me, the most frustrating thing is that I know what I want to say and can verbalise it clearly. The challenge comes in organising my thoughts into a logical, structured written format. In addition to this, I find the endless checking and re-checking of spellings and grammar mentally exhausting. As a consequence, I have spent a lot of my

career compensating for this by developing more visually led ways of communicating using drawing, model making, infographics, storytelling, bullet points and moving image.

It has been suggested by Daniel and Freeman (2018) that many dyslexic thinkers will scan a piece of written text, rather than read it line by line. The impact of this is that they often miss out on phonological processing details that add to the complete understanding of a text. In response to this processing trait, Eide and Eide (2011) state that some dyslexics 'operate with 'Stealth Dyslexia', using their advanced thinking to get the gist of what they read.' I recognise this trait in myself; I tend to be able to grasp overall concepts very quickly but miss specific or finer points that add to a more nuanced understanding. During the past decade non-text based visual communication has become more integrated and accepted with the rise of YouTube, vlogs, design thinking workshops, infographics, sound bites and emoji. For example, look at how news is now presented and consumed on the BBC website. The world is clearly engaging in the visual thinker's way of communicating, or at least inviting us to sit at the same table.

It is helpful for me to define my dyslexia as my own unique 'thinking space.' Thoughts and concepts during the ideation process are organised here. I define these thinking spaces as:

Community - How I balance the use of pictorial visualisations, written descriptions and role-play to engage with my practice.

Process and Tools - How I use both analogue mediums and digital technologies to think, organise and store information, (e.g. how I think on paper and how I think on screen).

Mobility and Location - Where and when I engage with the ideation process.

As a designer with dyslexia, I don't just use drawing to convey the image of a particular object, space or graphic output, I use it everywhere and for everything. I use it to convey abstract thought processes to myself and clients. I create shapes and symbols to represent opposing points of an argument and within meetings to bring together the ideas and opinions of stakeholders within a design process. Simply speaking, I draw while I think and talk, almost as a stream of consciousness. It has become my 'modus operandi,' it defines me, my workflow and my professional reputation. My portfolio demonstrates how my drawing practice has taken many forms over a range of different design projects. It illustrates how drawing has been a constant tool to enhance communication between myself, my clients, contractors and students.

8.2 Commercial and Pedagogic Biographical Perspective.

As a graduate of product design, I started my professional career in 1991 and have delivered multidisciplinary design contracts to national and international bodies. These include the British Airports Authority, Historic Scotland, Edinburgh International Science Festival, Historic Monuments Northern Ireland and The National Trust for Scotland. My expertise covers product design, interior & exhibition design, historical interpretation, model-making and prop design. It also embraces art direction and concept art for the gaming industry. I have held positions as a senior designer and studio manager for both large organisations and small consultancies and as a freelance sole trader. Since 1997, I have operated my own design consultancy, specialising in projects for the exhibition and museum heritage sector. Being employed in the creative industries has brought context and insight to my research. My professional practice requires me to work regularly away from my studio base and use trains, planes, airports and cafes as temporary places of work. This has been facilitated by the emergence of portable digital technologies.

From a pedagogic perspective my thesis has also been informed through my 20-years of experience as a design academic in higher education. I am an Associate Professor at Edinburgh Napier University and since 2010 have been Programme Leader for their BDes [Hons] Product Design programme. I have held a visiting product design lecturer role at Oslo Met University since 2008, delivering filmmaking and ideation methods to their undergraduate product design programmes. I have run international design workshops at L' Ecole de Design Nantes Atlantique, France annually since 2016. These workshops focus on mobile working, filmmaking and model-making ideation methods. All these themes align with my research. I have lectured in design studies at higher education design institutes in the Netherlands since 2012 and in China since 2009. I am currently an external examiner for BA (Hons) Product Design and BA (Hons) Graphic Design and Illustration at the British School of Higher Education, Moscow. These roles inform the holistic relationship between my commercial, pedagogic and research practice. My 'hybridised' relationship between two career pathways gives me a broad context to the provenance and insights of this thesis. This deep contextualisation is echoed by Sir Christopher Fraying (1997) who says that 'doctoral characteristics of originality, mastery and contribution to the field are held to be demonstrated through the original creative work.' He asserts that they should also 'include a substantial contextualisation of the creative work, and (that) this served to identify how the originality of the product could be claimed and what the scholarly contribution might be.'

8.3 Reflections On Writing This Thesis.

The process of writing this thesis can be best described as 'a roller coaster of a learning journey.' I experienced times of euphoria and times of dread, was occasionally crippled by Imposter Syndrome but then motivated by bursts of clarity. I learned to pace myself and made sure I stepped away from the writing for periods to manage fatigue and, at times, loneliness. I was sometimes anxious about missing out on other projects. Then came a point where I could

see the writing coming together and the impact of my practice and its contributions to new knowledge. The whole process has made me reframe how I will approach future projects and disseminate their outputs. I might not have had the opportunity to consider this had I just been working and teaching. It was tempting to continue refining content and editing this thesis as my learning and self-reflection progressed. This could have been never-ending! But the cumulative learning I garnered in the process made me understand the value of these insights for informing exciting new projects. I now see this body of work as the start of a larger, evolving learning process.

9. Appendix B: Academic Papers

9.1 Sand Casting on the Beach.

9.2 Using moving image to facilitate storytelling and ideation.

9.3 Work on the Move.

9.5 Carousel.

SAND CASTING ON THE BEACH—INTRODUCING TRADITIONAL MAKING SKILLS, MATERIALS AND PROCESS THROUGH PLAY AND EXPERIMENTATION

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ABSTRACT

Within the higher education (HE) product design field, many researchers stress the importance for students to recognise and value the relationship between practical 3D object-making experience, and experimenting with process and materials. Given the increasing pressures for design departments to sustain and keep large workshops, we face the perhaps inevitable consequence that product design students will lose fundamental physical 3D-object making skills. A case study from a sand casting workshop was used to investigate how new learning spaces could develop a teaching methodology to teach material and production knowledge, using low budget, low-tech, and practical object-making methods. The study showed that this learning space engaged the participants with the project and developed insights into teaching and learning that would not have been achieved through purely theoretical, studio-based teaching. Furthermore the workshop created an arena for social and professional interactions, and was found to be a possible tool for a discourse on sustainable design and production. The study led to developments in the design curricula of the participating institutions and resulted in learning outcomes of relevance for product design education.

Keywords: Crafts, learning spaces, international collaboration, ecology, material experimentation

1 Introduction

There is increasing concern within the HE product design community that teaching traditional object-making skills and material experimentation is decreasing [1]. One example is Bucks New University in London, which is closing its renowned undergraduate programmes in furniture design. Neil Austin, head of the furniture design course, said, ‘Creative courses are a little bit messy and a little bit big— they need workshops, they need facilities and they need space to play’ [2]. This issue was echoed by Apple’s chief designer, Jonathan Ive, who spoke recently at the Design Museum in London: ‘So many of the designers that we interview don’t know how to make stuff, because workshops in design schools are expensive and computers are cheaper ... that’s just tragic, that you can spend four years of your life studying the design of three dimensional objects and not make one’ [3]. In addition, there is a lack of skilled teachers in lower education [4]. In Norway, 70 percent of the educators

teaching arts and crafts under the age of 30 have no formal education in an art or design discipline. This has alarming consequences for staff recruitment into design at HE institutions, and impacts on the lack of practical object-making skills that students acquire while attending HE institutions.

Traditional object-making processes serve to develop principles and disciplines from which students are empowered to explore and engage with new object-making technologies. At a time when our digital tools allow for more work to be processed virtually, the traditional workshop can complement the development of the digital learning environment. This competence is important for new product design graduates who will face the challenges of working in industry once they graduate. Students should not need to rely on having access to large, well-equipped workshops in order to gain experience with hands-on object-making and experimenting with materials.

2 background

Several researchers have emphasised the importance of hands-on experience and the connection between crafts and process [1, 5, 6]. This is not a new opinion, and is in fact something Aristotle thought about: ‘Lack of experience diminishes our power of taking a comprehensive view of the admitted facts. Hence those who dwell in intimate association with nature and its phenomena are more able to lay down principles such as to admit of a wide and coherent development; while those whom devotion to abstract discussions has rendered unobservant of facts are too ready to dogmatize on the basis of a few observations’.

A more recent commentator is Glenn Adamson [5], who, in his book *Thinking through Craft*, views object-making and experience with materials as a craft and process that should be regarded as a habit of action rather than a fixed set of things. ‘Craft is not only a way of making things, but a way of making people: a means of social improvement.’ This approach gibes with the writings of John Dewey and the theories of the progressive educational movement [7, 8]. Dewey defined *experience* as a moment of interaction with objects and processes. Through engaging with these processes, students are offered opportunities to develop, and to grow their pride and self-esteem; these processes also promote mental and physical wellbeing. These building blocks could inspire students and empower education to not only build strong economies but also sound societies [5]. This view proposes that the interaction with objects and processes become more than just making objects, which aligns with the work of Richard Sennett [6], who views craft in this broader sense. He argues that the physical making of objects is part of being human, whether it involves making objects, food, or music. He suggests that physically making objects is needed to provide a balance from an increasing culture of screen-based mental processing tasks, both at work and at home. This could indicate that the increasing pace of learning, the easy access to information offered in the digital realm, and deadline-driven processes are having an effect on opportunities for students to reflect on their learning during projects.

The demise of physical workshop facilities within design education is a growing concern for many. Mathew B. Crawford [1] champions the need and recognition for

intuitive and tacit knowledge, stressing the negative effects that the decreasing workshop facilities within US design education has had on this knowledge. Without the opportunity to gain experience in physical object-making, Crawford argues that most forms of real knowledge, including self-knowledge, come from the effort to struggle with and master the reality of material objects. This corresponds to a large extent with the theories of Adamson and Sennett [5, 6]. Crawford further argues that the ideologists of the knowledge economy have posited a false dichotomy between ‘knowing’ and ‘doing’. The importance of doing is emphasised by Peter Dormer, who stated, ‘the constructive rules of craft are only learned by actually doing the activity’ [9]. In 2006, the designer Max Lamb made his ‘Pewter Stool’ [10], manufactured from a sand-casting process produced on a beach. This was a low-tech manufacturing approach with a minimum need for tools. The project showed that experience with some crafts and processes can be achieved without the need to have access to well-equipped workshops. From a design education perspective, Lamb’s work is interesting to us because it addresses different learning spaces. Setola et al. [11] use metaphors based on Kolb’s learning cycle [12]; the wild (concrete experience), the pub (reflective observation), the attic (abstract conceptualism) and the workplace (active experimentation) to visualise and emphasise the importance of different learning spaces through the learning journey. This view suggests that different learning spaces will support and encourage different learning experiences.

2.1 Research Question

From a design pedagogy perspective, it is interesting to use learning spaces creatively and to observe the impact that this might have on teaching and learning. Learning spaces are frequently discussed in design research, but there seems to be little focus on how the use of an outdoor environment might influence the learning outcomes within the context of teaching material and process. This led to the following research question: How to develop new learning spaces to teach material and production knowledge and skills, using a low budget, low-tech, physical object-making process?

3 method

The main research method is a case study [13] of a two-day ‘design and make’ jewelry workshop conducted in Edinburgh, Scotland. Participatory observation was used to study how students were responding to this playful and simple project structure, which emphasised practical experience with materials and process. An eco-philosophical perspective [14] was used to discuss the impact on environmental sustainability this method can have on the learning process.

3.1 The sand casting workshop

The workshop was developed through an established Norwegian/Scottish research and teaching collaboration. Thirty product design students and five teaching staff, representing both Scotland and Norway, participated in the workshop; we were also joined by a local professional sand casting company. We structured the workshop around a ‘lost Styrofoam’ casting process. Day one of the workshop was conducted

indoors, in the university's studio space. Students were asked to make jewelry models out of Styrofoam, which they sourced from discarded packaging materials. On day two, the project workshop relocated to a local beach. The Styrofoam models were dug into the sand, leaving one part of the model emerging above the surface of the sand (Figure 3). The attendees built a fire from driftwood found on the beach to melt pewter. The melted metal was poured onto the Styrofoam, melting and replacing it to create a perfectly matched cast. The cast artefact was then dug out of the sand and cooled in the sea. We also experimented with aluminum casting, which required using propane as a heat source rather than the fire due to the higher melting point of the material. Part of the finishing work on the casts was done on-site, but the unpredictability of the outdoor environment meant a trip back to the university to complete the rest of the projects.

4 findings

The workshop produced a wide range of findings, ranging from observations on individual skills acquisition, to impacts on the larger group dynamic. Students were noticeably more engaged in the process compared to similar workshop themes that were conducted in the studio. Using an outdoor teaching environment not only excited the students, but also led some to experiment in ways that may not have happened in a school workshop. For example, some students started to cast into patterns that they carved into the sand, while others cast directly into shells and similar objects that they found on the beach, which created some unexpected outcomes. Students clearly gained new insights into working with materials and a craft process. Many had difficulty understanding the transformation from Styrofoam to metal, however, and how that affects issues such as dimension and weight in a jewelry piece. Also, most students became obsessed with 'finishing' their jewelry, grinding away any perceived imperfections in the casts and leaving few traces of the making process.

The workshop also created an environment that encouraged social and professional interactions, which probably developed more easily and quickly because we were away from the more formal structures of studio- and office-based locations. The beach acted as a hub, bringing together representatives from two nations and participants from both industry and academia, as well as inviting the interest of inquisitive passers-by. Ideas generated as a result of the workshop were noted as opportunities to discuss and make changes to both university's respective product design curricula. In addition, the findings also indicated that similar workshops could be used as a platform to develop a discourse about environmental sustainability.

5 discussion

The aforementioned sand casted Pewter Stool [10] by Max Lamb, which he produced at Caerhays Beach in Cornwall, UK, provided a source of inspiration for developing this workshop. Lamb's technique, however, differs from the main method used in this workshop. He dug directly into the sand to create the casting mold and used propane as a heat source, while this project primarily used 'lost Styrofoam' casting and an ordinary outdoor fire for melting the metal. Despite these process differences, both methods are similar regarding the use of the beach as a studio and production space.

Lamb's video post [15] of his manufacturing process provided both a source of inspiration for our students and a context for the workshop. In particular, Lamb's work helped to demystify the casting process and manufacturing techniques for students who were engaged in design processes with the workshop for the first time.

5.1 Student engagement and learning spaces

Students were noticeably more engaged in the process compared to students' participation in similar workshop themes delivered in-studio. Of particular note was student attendance. All students arrived on time at a cold, rainy, and windy beach on an October morning, 4km outside of the city center. This is a strong indication of student engagement if we compare this to the late arrivals or absences that generally occur during studio-based modules. Students actively took ownership of their own learning; they did not want to stop the workshop, even given the challenging weather conditions. They wanted to organise future workshops through independent study, if it were not possible through the university. Dewey emphasised that through engaging with processes we are offered opportunities to develop, and to grow our pride and self-esteem; these processes also promote mental and physical wellbeing [7, 8]. To what extent this workshop achieved this is hard to measure, but the engagement from the participants was obvious. We could clearly spot both pride in their work and healthy self-esteem amongst the students upon completion of the various tasks.



Fig. 1. Experimentation



Fig. 2. Sand casting



Fig. 3. Lost Styrofoam

The natural restrictions imposed on the workshop (by time, weather, and light) focussed the project towards process-driven experiences rather than final project outcomes. Removing the expectation of a 'finished' project outcome likely freed the students to experiment and to make mistakes without the perceived risk of failure. Whilst care was taken to decrease risk from the workshop, the nature of the materials and process required an element of working with risk. In this context, risk was regarded as the control the students had over the processes and the impact on the outcome as a direct result of their object-making skills. The casting process was quite unforgiving, as there was no option to press undo or to reach for a rubber. The students were encouraged to work with their 'happy accidents' and unexpected outcomes.

Furthermore, we observed an interesting mind-set in most of the students. Nearly all were concerned with creating a smooth, blemish-free finish to their objects. On

reflection, this should not have been such a surprise, given the desire some students have to create attractive CAD visuals, aided by sophisticated rendering packages. This gave the teaching staff an opportunity to discuss with the students the possibilities of working with some of the random outcomes this casting process can offer, and not to erase the provenance of the object.

In addition, several of the students had difficulty predicting the outcomes of the different stages of the project process. For example, Styrofoam is an extremely lightweight material, and what is perceived as a logical size and scale for jewelry (when modeled in Styrofoam) might not be appropriate after it is cast in pewter. Students were told about these issues prior to modelling their designs, thereby gaining theoretical knowledge; at that stage, however, they did not yet have practical experience. This indicates that the change in appearance from one material to another is something one has to physically experience in order to successfully develop and control successive processes and production of objects. This example shows how skills acquired through hands-on experience is important for gaining material understanding. Furthermore it corresponds with the work of Sennett [6], who emphasises the importance of the close connection between the hand and the head, and views this as a dialog between a concrete practice and a way of thinking, which can evolve into discovering and solving problems. The practical, hands-on nature of the workshop required the students to continually wait and reflect on their tasks before moving on to the next step of the object-making process. This allowed students and staff time to discuss the progress of each project, and contributed to developing a holistic approach to the teaching and learning environment.

Looking at Setola's [11] thoughts on different learning spaces for different activities, it seems that the beach learning space affected the learning outcome differently than if the workshop had occurred in a school workshop. For example, students experimented with casting into found objects on the beach (Figure 1). A more unexpected example was the experience students had when they discovered a washed-up beam in a container near the beach. Students wanted to use this for their fire, but were surprised to discover the beam's high density. It was so heavy that it required four people to carry it, while two people could easily carry a similarly sized beam of Scots pine. In addition, they discovered the difficulties of cutting wet wood and getting it to burn. These experiences would not have occurred through teaching from a purely theoretical and studio-based perspective. According to Dormer and Crawford [1], these types of skills and knowledge are best learned through experience.

5.2 Social and professional interactions

The location and preparation of the workshop site needed careful planning from the staff, which required a number of visits to the site, working around tide times, Scotland's unpredictable weather forecasts, and access to the site for transporting materials. This extra-curricular activity proved to be a positive experience for the dynamics between the academic staff and the industry participants prior to the workshop, most of whom had not met each other previously. During the course of the day the site needed to be prepared, maintained, and dismantled, which were tasks that required collaboration between all participants; this promoted inclusive and equitable

interactions between staff and students. To encourage a good interaction with curious onlookers, it was important that we did not damage the beach; we needed to demonstrate that we were working safely and responsibly. An additional goal for the workshop was to further develop our existing international relationship by including industrial collaboration. An Edinburgh-based ‘green’ sand casting foundry was invited to collaborate with us on the beach casting day. We were pleasantly surprised to hear that they gained new knowledge from the process, as well, and remarked throughout the day about some of the processes and techniques that ‘they had not realised you could do this’. In addition, the company contributed skills and knowledge, becoming both learner and teacher. Some staff members were also new to this particular object-making process, so they became learners alongside the students; this forged a sense of camaraderie among all participants. This was a particularly rewarding example of developing a holistic learning experience.

One outcome from the workshop is that it has led to a discourse on workshop activity at the Norwegian University College. This discourse may lead to the implementation of several one- or two-day, material-based elective courses. Similarly, the experience of the workshop has led to proposals to restructure some module content on the product design programme at Edinburgh Napier University.

5.3 Contributions to a sustainability discourse

The workshop can contribute to a sustainability discourse. One way of discussing this is through Arne Næss’ theory on ‘deep ecology’ [14]. Through his ideas on complexity, Næss claimed that mature and stable ecosystems are characterised by great inventiveness and the multiple uses of resources, and that every society has alternative ways to satisfy its needs: if one factor reduces the possibilities, there are alternatives within the local community. The process of casting in the sand of the beach is an example of seizing other possibilities within the community when workshops aren’t available. The concept of deep ecology is interesting from a design perspective, because it emphasises the importance of relational thinking, holistic thinking and system thinking. These are all factors of importance within a holistic design perception. In deep ecology, everything is connected with everything else through a mutual, dependent relationship in a long-term perspective. It is a symbiosis, where all parties extract mutual benefits from each other through true companionship. In this workshop we used natural resources like sand, water, and wood found on the beach. The materials used for making models were discarded Styrofoam retrieved from the garbage. It was important to leave the beach unspoiled after use. This can be an important contribution to relational and sustainable thinking in design education. It is a way of experiencing a holistic, ecological praxis first-hand.

6 conclusion

One of the aims of this study was to develop a learning environment through hands-on experience with a physical object-making process. Sand casting on the beach proved to be a low-budget and low resource approach to hands-on learning and teaching experience, with a focus on working with materials and process. This working

methodology encouraged collaboration between students, academics, and practitioners, and inspired future, student-led learning events. Furthermore, it will likely lead to curricular changes in both of the participating institutions. The study indicates that traditional object-making skills still have a value and place alongside digital, 3D prototyping technologies and theoretical teaching. In addition, the method aims towards viewing the diversity of learning spaces, and how these spaces can lead to different learning outcomes. This outdoor learning space created an opportunity for experimentation, insight, and learning which would not have been possible in a school workshop. Using natural resources like driftwood, sand, and water, and the opportunity to leave the working space unspoiled once the project was complete, made it possible to view the workshop through the perspective of environmental sustainability. The extent to which the students experienced insight into the relative sustainability or unsustainability of our workshop is unclear. It is plausible, however, that this approach could be used in a sustainable design discourse.

The learning outcomes identified [16] in this study are relevant issues in product design education concerning knowledge, skills, and general competence. Having knowledge is to understand the importance of material knowledge in product development. Skills are related to process understanding and the skillful manipulation of materials. From a sustainability perspective, general competence is to see nature and design as mutually corresponding elements. This case study is based on a single workshop, but the phenomena identified has the potential to stimulate and foster similar outdoor object-making workshops. For future workshops it would be interesting to think about how to integrate the planning and logistics of organising the outdoor workspace itself, as a specific learning outcome for the students.

The workshop offered learning methodologies in addition to the chance to observe, listen, and physically engage with a process. It also provided opportunities to experience tacit knowledge, and required collaboration between all of its participants, each having a responsibility for one another and for the environment. In addition, lecturers, industry practitioners, and students had the opportunity to become both learner and teacher. This was a challenging and rewarding workshop and, in the words of Glenn Adamson, ‘Craft, because it is hard won, is always a revelation’ [5].

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USING MOVING IMAGE TO FACILITATE STORYTELLING AS AN IDEATION METHODOLOGY AND A PLATFORM TO ENHANCE THE INTEGRATION OF INTERNATIONAL STUDENT COHORTS WITHIN PRODUCT DESIGN EDUCATION

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ABSTRACT

The use of moving image within HE (Higher Education) Product Design is increasing. Here, film is commonly used as a tool for the presentation of concepts or finished objects, as an instructional tool, and in user observations and research. Iteration techniques that engage moving images to support sketching and reflection processes are starting to become more visible in the methodologies of product designers. As international collaboration becomes a key focus to many university development strategies, the increase in international student intake can create challenges when managing language, culture and different prior learning approaches. Nonetheless, research that addresses filmmaking as ideation and its impact on the integration of multicultural and/or international student cohorts is rare. This led to the research question: How can storytelling through moving image be used as an ideation methodology and as a platform to enhance the integration of international student cohorts within HE Product Design? To answer that question, this paper presents, analyses, and discusses a series of case studies that illustrate examples of the use of filmmaking workshops within HE Product Design. The studies were conducted over several years in collaboration with international exchange partners at universities in Scotland, Norway and China. A precedent that simple and accessible film editing software should be used to encourage clear and engaging storytelling, rather than style and effects, underpinned each workshop. The methodology of filmmaking proved to be a useful tool for breaking down cultural and language barriers. It also proved to be an effective tool for ideation processes.

Keywords: filmmaking, integration, storytelling, internationalization, ideation

1 filmmaking in design

Storytelling has always been an important part of human life. Stories excite us, and within the creative industries, the mantra '*People remember a good story, not facts*', is frequently cited. David Kelley, the founder and chairperson of IDEO, tells us that '*stories persuade in a way that facts, reports, and market trends seldom do, because stories make an emotional connection*' [1]. The use of stories to deliver a message is common in advertising and it is an effective branding tool as well [2]. Storytelling is common in graphic design and other forms of 2D visualizations [3]. In recent years, the emergence and accessibility of the digital realm has empowered students to create and deliver sophisticated project content that has challenged the traditional 2D presentation board format. The use of moving images has also increased. Film is widely used as a research methodology in the social sciences. Video can be an '*indispensable medium for*

collecting data and preserving their relevant features in a naturalistic perspective’ [4]. Vibeke Sjøvoll, Norwegian artist and design researcher, maintains that *‘in product design, video has mostly been seen as a tool for the presentation of concepts or finished object, as an instructional tool, or in user observation and research’* [5]. She says that *‘the most in-depth exploration of the inherent qualities of video is commonly found in fine arts’*. The use of film media is continuously evolving and has recently been used as a tool for creativity, playfulness [5] and reflection [6, 7]. In the case studies presented in this paper, students were encouraged to use technology to advance their designs, instead of merely ‘endorsing’ a design by using new technology and effects to present it. This concurs with the comments of Jonathan Crary [8] who warns that *‘in the near future there will be billions of individuals with a similar level of technological competence and basic intellectual assumptions’*. We were interested in using moving image as a platform to capture and present different stages of a design iteration process; to provide a single ‘hub’ in which the narrative of a process can be archived, documented and edited easily; and to enable the users to quickly review their process as a holistic experience as a project evolves. While international collaboration has become a key focus of many university development strategies, the increase in international student intake can also create challenges in managing language, culture and different prior learning approaches. The challenges of cultural barriers can result in emotional isolation and loneliness, which might influence the academic performance of foreign students [9]. Members of the research team regularly engage in staff mobility programmes in China; they accept many exchange students from Chinese universities into their own programmes as well. Some typical representations of the Chinese culture of learning is that students ‘do not question accepted norms and ideas’ in the classroom [9]; specifically, the teacher’s status and authority as a source of norms is central [9, 10]. With influence from the Confucian heritage [11], Chinese students have a reflector learning style preference, which means that they could take a less active role in learning, that they prefer to learn through observation and that they benefit from the opportunity to think before acting.

2 integrating filmmaking into a design process

The use of filmmaking as part of a creative tool kit in product design education has started to increase in recent years. One example is Sjøvoll, the aforementioned design researcher [5], who has used filmmaking techniques as a ‘sketching’ or creative tool to develop the approaches of individual product design students to their projects. She asked students to produce films to explore specific terms and themes, which were then used to inform their development. This methodology, which demonstrates just one successful application of integrating filmmaking into a design process, encouraged students to interact directly with each other, their subject matter and the wider social community that their products serviced.

2.1 Research question

Integrating filmmaking and digital storytelling as a reflection tool in HE Product Design studies has started to evolve [6]. Nonetheless, research addressing filmmaking as an ideation and ‘sketching’ tool [5] is scarce, and its impact on the integration of multicultural and international student cohorts offers newer ‘emerging’ opportunities to explore. This led to the following research question: How can storytelling through moving image be used as an ideation methodology and as a platform to enhance the integration of international student cohorts within HE Product Design?

3 method

The research question was explored through a set of case studies [12] executed through different ‘themed’ internationally based workshops. Participatory observation [13] was used as a method to study how students were responding to our constructed ‘playful’ filmmaking project structure. Two of our workshops were analysed through quantitative data collected from questionnaires. Students were encouraged to use a range of different presentation formats, such as talking head, short story scenarios, photomontage, animation, documentaries and news reports. Priority was given to clear storytelling, rather than accomplished technical execution. This was an important part of the method since we wanted to encourage the students to experiment with the medium and not be scared of it or of showing their results. Short time restrictions, ranging from 30 seconds to a minute and 30 seconds, were implemented on the filmic outputs to help focus the students’ decision-making and encourage them to edit information that was clear, engaging and precise. Emphasis was directed towards the use of the simple filmmaking software that comes as standard on both PC and Mac platforms.

3.1 Case study through multiple workshops

The case studies were organised into a set of short project workshops that explored different learning and teaching scenarios across a range of year groups. With a supporting aim of acting as an icebreaker activity to introduce and galvanize both student year groups and incoming exchange students, each study explored a different iteration approach and/or technique.

Workshop 1: Sketchbook recordings: Quick and dirty

Here, design iteration was encouraged through focusing on recording the students’ sketchbook content. Students were encouraged to use their original sketches, no matter how rough they were, and organize them in a clear narrative that described the evolution of their design process. They were further encouraged to select an appropriate soundtrack, related to the project theme, to accompany their film and create a ‘pace’ with which to edit the content. Because the illustration content was to be lifted directly from their sketchbooks, films were intended to reveal and promote original art direction that related to the individual students. A further aim of the workshop was to promote quick and efficient presentation techniques without pressure for the students to rework artwork into a state perceived as more ‘finished’. This was the first time that many of the students had engaged in an animation process.

Workshop 2: Overcoming language barriers

A range of projects was delivered during a teaching exchange in Zhegzhou in Southern China. Nearly all of the participating students were non-English speaking. The class sizes were large, ranging from 80–120 students per class, depending on the particular year group. Translators were available. During our workshops, roll playing and scenarios were acted out and recorded between students and staff. Demonstrations were captured either through video or as a photomontage and used as visual learning aids, viewed on large screen projectors as well as for working off tablets and smart phone screens.

Workshop 3: Aircraft toilet: User profiles

The focus of this Edinburgh based workshop was to design and build full size toilet units, modelled in cardboard, for use on commercial airlines. Eight groups of six students each, from

a cohort of first year product and interior design programmes, were given a specific user profile to consider (e.g., pregnant passenger, broken leg, super hero, visually impaired, wheelchair user, scared of flying, etc.). The groups were asked to user test the initial design of each group, while keeping ‘in character’ of their allocated persona. The students filmed the results of these initial tests and used it as user feedback to review and inform their design iteration. The final project outcomes were then filmed for a third time with more focus placed on a presentation narrative. The aim of the user profiles was to encourage students to think about their designs from a different perspective, thus considering the needs of a broader user group. The diverse user profiles were chosen to enrich the student experience through acting out scenarios in character and encouraging debate between participants through physical hands-on activity.



Figure 1.1. Using mobile devices to aid language issues in non-English speaking schools
 2. Role-playing with user personas. 3. Integrating live action and illustration
 4 and 5. Sketchbook content used as source material for animation 6. Editing film in teams

Workshop 4: Juice or coffee: Feedback and feedforward

In this workshop, held in Lillestrøm, Norway, forty international students, including Norwegian, Japanese, Polish, German, Scottish and Spanish, worked in eight teams to develop design solutions for a domestic juice or coffee-making product. To help analyse the design proposals, students mounted full size marker rendered design concepts onto cardboard and used them as props during filmmaking. Students then viewed another team’s film and made a second ‘review and feedback’ film to give back to the original team. A third ‘final’ film was produced based on findings from the previous two films.

4 findings

The act of making and presenting projects through a moving image methodology had a noticeably positive influence on the impact on student engagement and a constructive effect on breaking down the language and cultural challenges that we often face when working internationally. In the international focused workshops, actions/images spoke louder than words and the communication between staff and students was more direct with limited need for translators. The use of filmmaking in the presentations helped to increase the confidence of most of the students and it gave a voice to students with

limited English. This was evident by the use of suitable cultural references, such as the incidental things like music, fashion and humour, displayed by some students in their films, which revealed something a little deeper about the personality and interests of the individual students. Through storytelling and role-playing, students were empowered with a sense of fun, excitement and a desire to produce and present a finished film. Presentations proved to be more of an event with a degree of pre-presentation excitement and anticipation. Within the student cohort, there was a range of skill bases and students were quick to share techniques and suggest useful, relevant software. Using multiple deliverable points meant that students had numerous opportunities to engage in peer-to-peer learning. We observed many students working directly from their mobile smart phones: recording, editing and uploading all from the same smart phone. It was interesting to see that since the students did not need to return to a fixed studio space, the iteration process could be conducted in situ. This also affected the pace and fluidity of the project development. In reviewing the workshops where we engaged student feedback, the feedback from all of the participants in the coffee/juice and the aircraft toilet workshops was that they would use this type of filmmaking process again.

5 discussion

The filmmaking process was received as a positive experience amongst the students. A number of the feedback comments highlighted their enjoyment of the process: one student wrote, *'fun, fun, fun.'* in the feedback questionnaire. Digital media, platforms and processes are familiar to most young adults, as Sjøvoll explains [5], *'Using video also strongly connects with the visual culture that surrounds the students in their everyday life, as digital technologies constitute a significant part of the language through which we express ourselves.'* While some are skilled in movie making, others have less experience. Nevertheless, what we saw repeatedly is that students did not need a technical explanation of how to make a movie. Either they knew how or they found out how. This concurs with Sjøvolls' findings [5].

5.1 Filmmaking as an ideation methodology

Even though digital media was not new to the students, using film and storytelling as an ideation process was. The nature of filmmaking provides a structure in which the creator needs to constantly review, reflect and observe their work. In the context of HE Product Design studies, providing the students with an opportunity to view their work, either from another perspective or in the third person, proved to be an invaluable outcome of the filmmaking methodology. Photographic media (still or moving) is used because it is particularly good at carrying or evoking three things: 'information, affect and reflection'[14]. As a result, photos can be described as *'a more transparent representation of the life experiences of participants in [a] study'* [15]. This concurs with a comment from one student who said that it was *'easy to evaluate other team's concept and had good time to give feedback'*.

As explained in the method chapter, we made three films of each idea in the Lillestrøm workshop. The students found this tool for ideation development useful. They

commented that they liked the stages of making more than one film. To let the groups swap concepts and make feedback films for each other clearly led to developments that would not have occurred if the ideation had been kept within the group. Participants commented that they liked this methodology. Some workshops experimented with ‘hybrid’ ideation approaches by combining marker rendering, animation and live action displaying a range of ideation tools. The evolving use of social media and the accessibility of digital mobile devices enabled students to capture and edit information in both studio and at site-specific locations.

Placing short time restrictions on film presentations required students to reflect on and edit their work more precisely and with less procrastination. Many students commented on the advantage of working quickly, as illustrated through this student quote, *‘I liked the pressure of time.’* By working in the moment with a limited time to refine and finish the visual content, there seemed to be a spontaneity and freshness to ideas and presentations that might otherwise be compromised by having the availability of more time and resources. Nonetheless, some students wanted more time in the process and, in the workshop in Lillestrøm, there was a general wish from the class that the workshop be extended by one day to produce a more finished result.

With regard to presentation days and feedback, we required only a projector and a surface on which to project. This made set-up time quicker and did not require the preparation, hanging and ‘financial’ cost of multiple presentation boards per student. This is interesting to consider, as compared with a more traditional static graphic presentation format that requires students to attend a degree of competence in a range of presentation skills before they can effectively deliver their presentations. One student wrote in the questionnaire, *‘Better and more engaging than standing up at the front trying to explain our concept.’* We observed that a filmic presentation with strong narrative was more forgiving on any technical shortcomings, specifically, *‘People remember a good story.’*

3.2 Filmmaking as a tool for student integration

The act of making and presenting projects through a moving image platform had a noticeably positive influence on student engagement and a constructive effect on breaking down the language and cultural challenges that we frequently face when working internationally. Indeed, language barriers are a challenge to many students and teachers. In this study, the majority of the participants did not have English as their first language. Moreover, we have noticed that many non-English speakers are afraid of speaking English, especially at presentations. To prepare a film can ease the pressure on these students. In using this method, the voice of the shy can flourish. It also brings clarity that bridges limited language skills: as one student reflected, *‘It’s easy to catch the point of another’s concept.’* Another student said that filmmaking *‘makes it clear, simple and a short cool way to catch a client’s attention and show more sides to a product and how it interacts’*. Although translators were available at the workshop in Zhengzhou, the number of non-English speakers created its own challenges since many of the subject specific terminology and processes tended to get lost in translation. Here, the films created a ‘language’ that made it easier for people to understand each other across culture and language barriers. One student said, *‘it [film] is a good way to*

describe and show without having to explain'. Moving images provided simple storytelling and narrative. The medium is not the message; therefore, we have seen that sometimes almost childlike execution, such as line drawings and finger puppets, effectively conveys the message if the narrative and structure of the presentation is strong and cohesive. Through a cycle of play, pause and repeat, students can experiment, edit and review their work before presentation day, thereby instilling a personal confidence in them that they will deliver their key messages without fear of freezing. As one student explained, *'The nice thing is that you can use it to see it as many times as you like. That gives more times to find out what can be improved or done differently.'* Although the ability to work in this way has proved useful for breaking down cultural and language barriers, the methodology is also useful and it gives the students confidence when cultural differences and language are not an issue.

6 conclusion

It has been said that making a film is done in three steps: first, it is written, then filmed and then edited. The advantage of this approach is that it gives space for reflection between the various stages of a creative process. Using the example of a typical 30-second TV commercial format, the rule of 'say it, explain it, repeat it' can provide an extremely focused set of parameters in which a student must deliver his/her pitch. This limited time-frame has beneficial impacts on the assessment staff members who need to sustain focus, stamina and alertness when providing feedback to large student cohorts. We found that using moving image as part of a larger teaching skill set gave us options to focus our teaching between ideation and integration without them being dependent on each other. However, it did feel there was a natural synergy between both aspects of the research that only served to enhance the overall learning and teaching experience.

All of the participants in presentation days are contributing to the day, not just 'getting through it'. The capacity for a reflective dialogue with moving images, combined with the immediacy and accessibility of the software, allows students to continually evaluate and iterate their work. Within group projects, students have more opportunities to allocate specific responsibilities (such as model making, filming, editing, directing and motion graphics) among their peers, all of whom contribute to the overall production of the product.

In the context of working internationally, integrating moving images into a teaching and learning environment provided a universal language of image and sound to which that all of the participants could understand and respond. Acting out scenarios and role-playing facilitated numerous opportunities for the students to interact with each other and build relationships, which, in most cases, had a positive effect on group dynamics. In addition, relationships between students also occurred through peer-to-peer learning by a sharing of knowledge of technical 'know how' on common/familiar media platforms, such as tablets and smart phones.

Since it is a powerful communication tool in helping to negotiate language barriers, it is also worth considering the empowering effect of filmmaking methodology in encouraging more teaching staff to engage in overseas teaching workshops. In terms of assessing project outcomes, through the association with the story, staff members have often remembered the product/projects and the student(s) long after the event has finished. Moving image methodology has introduced new skill sets to our students. This has been reflected in surveys of our recent graduates who have integrated moving

images into their scope of work, such as through kick-starter promotions, or who have diversified into other areas of the creative industries, such as exhibition, audio visual and entertainment industries. This further promotes, strengthens and enriches the opportunities that HE Product Design programmes can offer. Moving image processes can provide a single hub in which a range of hybrid creative industry skill sets can be crafted into a holistic design iteration process.

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Work on the Move

Abstract

‘Work on the Move’ is a design, process-driven methodology, which uses multiple locations within an outdoors setting and movement between locations, all of which function as learning places, confined to a specified time period.

Between 2012 and 2015, a team of international Higher Education product design educators (all members of Carousel, a co-operation of Erasmus members in Zwolle, Edinburgh, Nantes, Rome, Kortrijk and Oslo), industry professionals and product design students developed and tested four case studies. Each case study was conducted in a different international location and was constructed with a different focus, to help define and refine a definitive working methodology.

‘Work on the Move’ explores the influence of ‘place’ upon design, in terms of the impact it has on productivity and creative problem-solving, when working away from the traditional studio/office-based environment. It also explores the significance of shared place, when working directly with a client *in situ*, and experiencing the place-based influences upon their businesses. While identifying location as part of the design process, the study also seeks to understand the effects of time restriction and working in transit upon creativity and productivity, within the context of specific projects.

Keyword

Place, Nomadic, Collaboration, International

Introduction

The designer, as the traveling figure whose “making” and “belonging” are embedded in the traditions of artisanal cultures, is brought to the fore in Sennett’s *The Craftsman* (2009); wherein he presents a description of the craftsman as someone that fuses cultural production with social values. Sennett (2009) tells us that “learning becomes local” (p.179) and involves improvisation where microenvironments inspire and produce experiences and forms. Sennett’s craftsman moves through society responding to hidden and complex orders and materials. Sennett’s work is useful to the study that follows, because it reminds us that relations between place, making and materials are fluid and provide design research with a set of tools through which we might “approach the world in order to discern the preconditions of a design” (Nelson and Stolterman 2012, p.120). It is interesting to consider how, as globally-influenced and highly-mobile professionals, designers continue to respond to places as our nomadic craft forefathers did. However, whether the designer’s interaction ‘with and through place’ is as rich and generative as Sennett’s craftsman is less clear. Certainly, there are shifts made possible by the flows of goods and networks of finance, through exploiting digital communication technologies and tools, where present-day design teams often work remotely, in multiple locations.

Crary (2014) compellingly argues not only that technology has vastly changed how we think and how we do but also that the immediacy and veracity of digital information can relegate some real-life activities, which do not have an online correlate, to a lesser relevance or even allow them to be robbed of meaning. “Indeed, it seems that there is always something online that is more informative, surprising, funny, diverting or impressive than anything in one’s immediate actual circumstances” (p.59). It is now a given that the limitless availability of information or images can override any human-scale communication or exploration of ideas. ‘Work on the move’ is a response to those shifts in mobility, place, time and informational networks that not only influence how and where we conduct research but also acknowledge their transformative influence on the self-narration of the designer’s experience. ‘Work on the move’ explores how a slower, peripatetic design relationship with the world brings the designer closer to the social world and informs design research, collaboration and creative outputs.

Solnit’s (2001) reflections upon the cultural history of walking reveals the significance of walking and transitional, nomadic experiences in many professions across time and culture. Referring to the sometimes transitory status of musicians to medics, she comments on how they can possess a type of diplomatic immunity from communities that keeps its participants local: “a solitary walker is in the world, but apart from it, with the detachment of the traveller rather than the ties of the worker, dweller and member of a group” (Solnit 2001, p. 21). Solnit’s treatise on “Wanderlust” reflects upon thinking through walking as an embodied creative rhythm; thoughts and places

according to this line of reason are symbolically charged. She refers both to Rousseau's (1712 – 1778) confession, “I can only meditate when I am walking. When I stop, I cease to think my mind only works with my legs” (2001, p.14), and to Thomas Hobbs' (1588-1679) personally-modified walking stick, built with an inkhorn, to allow him to jot down his ideas as he strolled through the streets of London and Paris. (2001).

International beginnings: Aims, place, time and movement

The initial idea for “work on the move” was developed through co-operation with product design academics from Edinburgh Napier University in Scotland, and Windesheim University of Applied Science in Zwolle, Netherlands, and was tested with design lecturers from Sapienza Università in Rome, Italy, and from Howest University College West Flanders, in Kortrijk, Belgium. The group, called Carousel, these universities form, which also includes the L'École de Design Nantes Atlantique in France and the Oslo and Akershus University College of Applied Sciences in Norway, is the main vehicle for further exploration and development of this innovative methodology. Within Carousel, there is a significant opportunity to test and develop the methodology with lecturers, students and external clients. Using this international stage also makes the results more relevant for both design educators and those whose work demands inter-cultural competences in design and research.

According to Nelson and Stolterman (2012), design is adaptive, connective and compositional and is always part of a creative, generative relational process. As a designer:

. . . you participate in the creation of a real world. To do that, you need the world to make sense to you. To design is not to create things that make the world more reflective of the true. It is rather to create a world that has more meaning, that makes more sense (Nelson and Stolterman 2012, p.122).

Our research explores and develops design innovation methodologies in relation to processes involved in idea generation and problem solving. In particular, the study explores how working away from the traditional studio-based environments—in multiple locations—impacts creativity and the group dynamic among students, co-workers and clients. Time restrictions and the experiences of journeying between places relates to ‘embodied cognition’ (Barsalou 1999; Schwartz and Black 1999) in terms of the influences on movement and thought. The research results may be used to inform student projects, to develop HE design curricula, and to create a methodology for industry application.

The research team developed four case studies, each with a different location and design brief, to explore the impacts on collaboration, place, movement and time.

Within each case study, multiple venues were identified, each used to mark a different stage of the design process. Routes between venues were planned to encourage shared experiences of traveling temporally, geographically and collectively; being in between design processes allowed for reflection and discussion, before consolidation at the next location. Through the constant flow and transition of working around a city, this activity sought to create the opportunity for random acts and experiences that could potentially influence the design process. These shared experiences challenge the traditional studio-based work flow, and the internal relationship hierarchies within a design team. In addition, such a work process expands the external relationships between client, designer and user. In other words, this mobile workshop allowed participants to be both tour guide and tourist.

Methodology

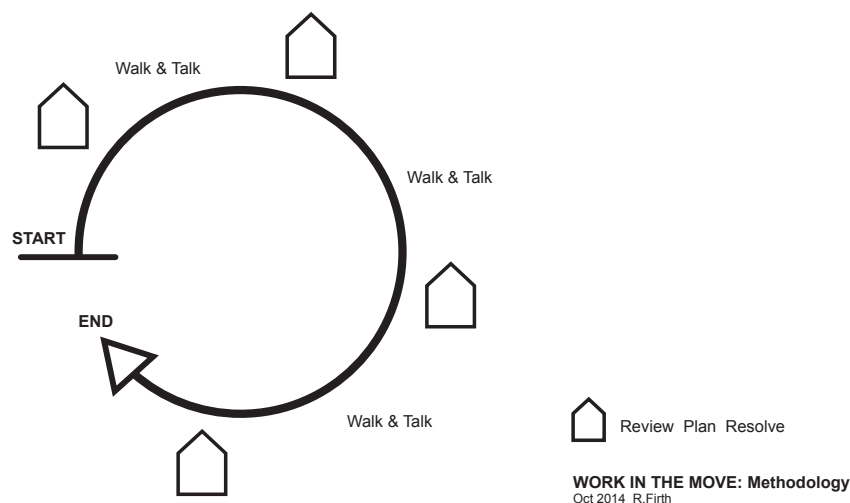


Diagram of basic project structure.

The host participants set a design brief, then prepared a specific brief-related itinerary, containing locations and routes around a city. Careful consideration was required to allocate appropriate time at and in-between venues. Time was allocated at venues for more focussed reflection, and to collate and visualise discussions. Time spent moving between places was used to encourage more casual discussion and reflection. Participants' relation to time and space was organised to make them feel confident to embrace and discuss random experiences, and to respond to the larger group's collective knowledge. The methodology proposes an important emphasis between travel and the development of knowledge, which is supported by studies such as that of Oppezzo and Schwartz (2014), where walking is identified as having had a strong

influence on the expression of associative memory: “The act of working and experiencing a variety of external stimuli increased, talkativeness between participants. We hypothesised that when walking, people generated more ideas, and more of those ideas were novel and site-sensitive”. (2014 p.1148).

All participants had complete, non-prescribed freedom to record and express their ideas, using their preferred method to capture data. Our aim was to mitigate issues of restriction, potential conflict, or of authority by not imposing a specific method. It was interesting to observe the variety of methods used: from a phone/camera, a sketchbook, a napkin, the back of a hand, or a tablet, to using pencil or charcoal with which to write. Four case studies were conducted to explore the effects on the design process, through engaging with different places and routes, plus different team collaborations and time restrictions, within “a real world setting” (Bromlry 1986, p. 23), focusing on contemporary, as opposed to historical, phenomena (Yin 2003). The research findings were refined over each consecutive workshop, with the aim of creating a definitive, working methodology.

Case study one: Project: ‘Tea’ — Edinburgh, March 2014



Route taken for Tea Brief.

The first of the case studies was conducted by four members of academic staff—two from the BDes(hons) Product Design programme at Edinburgh Napier University, and two from the Product Design Engineering programme at Windesheim University of Applied Science, Zwolle:

Our brief was designed to be very open, using the simple title, “Tea”:

- Tea represents: object, service, ceremony, habit, ritual.
- It allows us to stop, reflect and down tools.
- It provides an opportunity to talk, council, gossip and listen.
- Tea evokes multiple meanings and experiences, such as tea lady, tea trolley, greasy spoon, café, builders tea, high tea, flask, and “more tea, vicar!”

Observation and reflection was our starting point. Over the course of a day, during a twelve-hour period, we visited a variety of places where tea is served and people interact: 1) the Social Bite—a social cause-driven business, tea and sandwich shop, which trained and employed homeless members of the community; 2) a repurposed police box/coffee station, of which many are located around the city; 3) a bike store/café hybrid business; 4) a community arts centre; 5) a hotel for high tea; and 6) a city centre bar, for a themed tea and cocktails event. Each venue was chosen to provide an experience with a diverse user group, a unique social experience, and a separate context for taking tea.



Observation of an additional role of a tea pot during a conversation.

A key finding of the day was how the group dynamic worked during each walking phase of the study. In particular, we observed how random encounters impacted conversations within the group and influenced the direction of the design brief. For example, while walking, a team member from the Netherlands noticed and enquired about ‘tenement living’, which is common in Scotland; this quickly escalated into a lively group discussion about other examples of domestic living from both historical and literary references. These conversations lead us to agree upon our first design direction: our solution should address both community and social interaction.

Walking freed us to think in tangents and contradictions without fear of being judged, and the use of anecdotes from historical literary references became a common practice to draw people into the conversation.

Case study two: Project: ‘Eat in the City’— Edinburgh, March 2014



Using portable data projector to brief students in the city centre.

This workshop was run over four days within the Edinburgh City Centre. Participants were organised into teams from an international student cohort of forty year two product design students from Edinburgh Napier University and Windershiem University of Applied Science, Zwolle.

Using the experiences and examples from case study one, students were encouraged to actively use the city’s various locations as studio, research and user testing places, and to exploit their personal digital devices and social media platforms to record, gather and manipulate information. The four-day project structure allowed students to focus and commit to the project without interruptions. The activities outlined for each day were as follows:

- Day one: Observe, record, and develop concept.
- Day two: Present in studio, build full-size models.
- Day three: Take models back into the city, test and create a one minute film presentation.
- Day four: Present your film, in location to your year group.

The students commented that the immediacy of working in different places created a quick turn-around of ideas and consolidated decision-making. The variety of locations and tasks, and the time-restrictions we imposed, challenged the more traditional linear

learning structure to which the students had been accustomed. We also observed students' stamina and endurance greatly increased, due to the variety of tasks and changes in learning places. It was commented on that the transitions between places gave students downtime to reflect, refresh, and plan for their next tasks.

Students worked in teams mixed from the different international design schools, with the host students taking responsibility to act as tour guides for their visitors. The host students enjoyed the autonomy and responsibility to show 'their city' outside the boundaries of their regular university surroundings, time tables and structure. We observed students building relationships quickly, taking pride in their city, and taking ownership of their projects.

Students worked in a variety of places including bars, cafes, art galleries, libraries, parks, and on public transport. Of particular value to this study was observing the visiting students integrating their studies with their experience of a new city, as opposed to being based in a design studio during the day, and only engaging in outside social activities in the evening. One comment from a student participant reveals this unique experience: "We got to see parts of a city that a tourist might not, you got to feel like you were part of the city and lived here a little, it made me feel confident to apply for longer (international) student exchanges." (*3rd year product design exchange student*).

Case study three: Project: 'A Greener Town' — Zwolle, March 2014

Case study three was devised to observe how the methodology responded to the participation of a larger, academic design team. The group increased to include Carousel members from Italy and Belgium, for a total of seven participants, and some members had not met before. We conducted the case study using the one-day time format developed in case study one.

It was noticeable that the interaction between participants in the larger group was not as effective as it was within the smaller group used in case study one; we were mindful that this might be due to personality and cultural differences. It was reasonable to conclude that teams with larger participant numbers would benefit from the introduction of a team leader role to organise and pace the day.

The Netherlands hosts had planned in advance to spend most of the day traveling on foot and by bicycle. Poor weather conditions made this unworkable, so alternative travel methods, routes and places were improvised on the day. This proved to validate the flexible nature of the 'work on the move' philosophy, by working with and responding to changes in the environment. However, we felt the reduced opportunities to 'walk and talk' did impact the ease and flow of interactions between some group members. It was also observed, when we sat around tables in different venues that it was not always easy to find adequate spaces to accommodate the group, and inevitably there would be some participants seated at opposite ends of the group. During this

case study, one of the participants made an active choice to be the ‘group scribe’, documenting each conversation and milestone through illustrations in a sketchbook. This proved to be an extremely effective approach for capturing, organising, and distilling conversations and data. Sketching, in the moment, gave a linear, working account of the day, which meant that that content for the final presentation was being produced as the project developed. As a result, there was very little additional work to do at the end of the workshop regarding collating, organising and presenting the findings. This meant more time could be allocated to design development and refinement, rather than spending time working up additional presentation content.

Case study four: Project: ‘Baggee’ — London, May 2015

Case study four explored the ‘work on the move’ methodology through collaboration between academic staff and an industry partner. Our client, Baggee, Ltd., required some initial R&D on one of their existing product ranges, with regard to developing product and market diversification opportunities. We organised the workshop around a smaller number of participants, using the results from the previous case studies that found smaller groups to be more effective for this work: one client, and two academics from Edinburgh Napier University. The smaller group size was less intimidating for the client, while moving around a city, working peer-to-peer, broke down some of the traditional client/consultant hierarchies. As our client became more familiar and confident with the methodology, he suggested alternative venues to the day’s original agenda; this helped the client shape his thinking, take ownership of the project and, in turn, stimulated the design team. Our client commented that there was “just enough organising and loose outline structure to the day to not be threatening.”

At venues, we used hand-sketching to provide visual feedback to the client and to plan the objectives for the next location. This structure kept the momentum and focus of the day moving forward, while acting as a softer approach to traditional project management and organisation. Indeed, it was due to this less formal discourse that inspiration and innovation occurred with regard to the project outcome. For example, we randomly encountered a party of co-workers celebrating at a lunchtime venue. We observed the exchange of gifts and the reactions to them, which then inspired us to think about our own brief to design ‘themed party event’ products. This was an extreme shift in the focus of the day’s thinking. As a result, we quickly reorganised the rest of the day to research this specific market sector and user group. Through this collaboration, we experienced inspiration, primary research and site-specific observation in a rapid, two-hour time frame, with both client and consultants sharing real-time experiences, discussing possibilities and creating concepts.

Discussion

‘Work on the Move’ responds to shifts in mobility, place and informational networks, bringing the designer closer to the social world. When reflecting upon the research throughout the case studies, we noticed similar behaviour trends in relation to: controlling time on specific tasks; reacting to random encounters; using multiple venues to inform the brief; and using physical movement. These behaviours all contributed to facilitating more informal communications between participants, which encouraged the sharing of more diverse and abstract thinking.

Limiting the time spent at venues meant decision-making was physically framed within defined short chunks of time. This encouraged participants to focus on specific tasks, limited ‘mission creep’, and helped to clarify new deliverables when planning for future locations. The variety of workshop structures, and the introduction of random stimuli, helped prevent project fatigue and allowed participants to let their minds wander and refresh, particularly in the phases of walking between venues. Solnit (2001) refers to “the time in between”, the time spent walking and meandering, as important to facilitating “uncluttered time” and to providing relief from screens, earphones and mobiles, which we found a positive influence in the design process. When observing students’ participation, we witnessed a shift in their use of mobile technologies. Students engaged more with their physical surroundings, and spoke with the public and with each other. Digital devices were used primarily as a working tool, rather than as a form of physical, social distraction. This observation is particularly revealing and offers a more positive view of technology’s influence on social interaction than that offered by Crary (2014), who comments: “Instead of a formulaic sequence of places and events associated with family, work and relationships, the main thread of life stories now is the electronic commodities and media services through which all experience has been filtered, recorded or constructed” (p.58). Observations and experiences that are offline begin to atrophy, or cease to be relevant” (p.59).

By keeping results in a constant state of movement and working in the moment, there seemed to be a spontaneity and freshness to ideas and to presentations, which might otherwise be compromised by the expectation to use studio resources to complete more finished, polished project presentations.

Conclusion

Crary (2014) describes a framework, through which the world can be understood to be depleted of complexity and drained of whatever is unplanned or unforeseen, with many forms of social exchange remade “into habitual sequences of solicitation and response” (p.59). Responses, Crary argues, “become formulaic and reduced to a small inventory of possible gestures or choices” (p.59). ‘Work on the move’ allowed its participants to experience a revised relationship to the work experience as informed by place and interaction between collaborators.

The major contribution to innovation provided by ‘work on the move’ is the methodology’s use of time, place and movement between multiple locations. In all of the case studies, participants used familiar problem-solving processes, engaged with common accessible technologies, and communicated through talking, sketching, note taking and moving images. However, it was the impact of place and time on these familiar working methodologies, which influenced how they were implemented and the effect they had on the various projects’ creative outcomes.

‘Work on the Move’ kept processes fluid, limited the time to dwell on decisions, physically changed environments and facilitated random unplanned stimuli. An important cumulative effect of these conditions was the impact it had on the group dynamic. Through the nomadic engagement with place and project, participants were more willing to share ideas, and were not paralyzed by the pressure of having to conform to a prescribed presentation format, or by a standard most associated with studio culture (Clayton, Thomas and Smothers 2015). As Clayton et al. (2015) comment, “Walking meetings act as micro versions of the bonding that can be experienced when co-workers travel together on business trips” (p. 2).

Complementing this statement is the conclusion that ‘work on the move’ helps to dissolve some organizational hierarchies, a finding that also agrees with the work of Clayton et al. (2015), who state: “The fact that we are walking side-by-side means the conversation is more peer-to-peer than when I am in my office and they are across a desk from me, which reinforces the organizational hierarchy” (p.2).

Despite the importance of place, and more specifically, movement through place, it can be argued that design can all too easily be satisfied by technology and platforms that dissolve distances and time, while only allowing for a mediated understanding of culture. ‘Work on the move’ offers social and cultural experiences in a contemporary real-world setting with a broad stage on which to explore, play and contribute. ‘Work on the move’ is also structured to provide closure at the end of the day. We noticed that implementing short timescales, and reassuring participants that all contributions were acceptable, created more relaxed, energized and enthusiastic outcomes.

Thinking about ‘work on the move’ as an educational methodology, could using place and mobile learning within our cities be integrated into the HE Product Design curriculum; what would be the impact on teaching costs and resources? To further explore these questions, both the Norwegian and Scottish design school participants have incorporated this methodology into some of their module structures, using site specific out door learning spaces to deliver learning and teaching experiences.

Finally, we return to Sennett, who makes a case for such “lost spaces of freedom” (p.114): spaces in which craftsmen can experiment with ideas and techniques, risk

mistakes and lose themselves to find themselves. This notion echoes the principles of ‘work on the move’, wherein its participants were offered an environment in which to escape, think, discuss and create, without the traditional protocols of an office, or studio, setting.

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CAROUSEL: A STUDY ON COLLABORATION WITHIN A SMALL INTERNATIONAL DESIGN COMMUNITY OF PRACTICE AND ITS IMPACTS ON DELIVERING ‘ONE WEEK’ EXCHANGE EXPERIENCES

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ABSTRACT

To prepare students for their future careers in a globalizing society, several large-scale higher education student and staff exchange programmes focus on international collaboration. The organisation and duration of such programmes can often be a barrier for students and staff hoping to engage in global educational opportunities. This case study of Carousel, a recurring one-week exchange workshop, explores the potential and benefits of this shorter, international collaboration programme as compared to the longer-term Erasmus programme. The study shows that small-scale, repeated cooperation between a limited number of partner institutes can have a large impact on international and cross-cultural awareness and professional competence for both students and staff. Short communication lines between teaching staff from each Carousel partner makes the organisation of visits and workshops flexible, easy, and fully adaptable to the educational needs of students. As a result, students become much more internationally engaged and are introduced to different design cultures and methodologies. In some cases, participation in a Carousel workshop has led to a subsequent longer period of institutional exchange. Carousel also offers an opportunity for academic staff to collaborate in the workshop with their students and host an academic team and to experience different approaches toward design practice and educational delivery. Due to the informal character of Carousel, working relations between staff have tended to be of a much more personal nature. This had lead, in some cases, to a collaborative ‘ongoing’ research culture between participating academic staff and has generated new teaching and learning methodologies.

Keywords: International collaboration, design community, workshops, exchange programs, cultural understanding

1 Internationalisation and globalisation in Higher Education

Internationalisation and globalisation have gained an increased emphasis within European higher education programmes (HE)[1]. Presoto et al. [1] describe the internationalising of HE curriculum as providing students with global perspectives of their discipline and giving them a broader knowledge base for their future careers. Furthermore, they state that this develops cultural competence, such as “intercultural

competencies” or “cross-cultural capabilities.” Nuffic [2], in the Netherlands, has defined international competencies as “competencies relevant to interaction with people from other countries.” Similarly, intercultural competencies are defined as “social skills and forms of behaviour relevant to interaction with people from other cultures” [2]. Furthermore, they demonstrate that programmes devoted to internationalisation can also yield standard learning outcomes such as professional knowledge or personal skills. One way to work toward these goals is through exchange programmes. This study is about how our institutes develop, offer, and deliver international exchange experiences within HE product design study programmes. Specifically, we focus on the impacts of Carousel, a small revolving one-week international exchange workshop and discuss this in the context of EU’s longer and much larger Erasmus student exchange programme, which operates with a three-month minimum length.

2 Mobility challenges

If globalisation, cultural competence, and international competencies are a goal for HE [3, 4], it seems obvious that a large number of student and teacher exchanges are necessary. The main barriers for student participation in the Erasmus exchange programme are: lack of awareness of the programme and possibilities for travel, Erasmus conditions (regulations and administration), financial barriers, HE system compatibility, and lack of personal motivation [5]. To increase the number of students studying abroad, institutions have implemented many successful initiatives, ranging from compulsory years abroad to the promotion of language learning and improved student services abroad [5]. One idea relevant to our case study is discussed in an EU education and culture research paper [5] concerning ways to improve participation in the Erasmus Programme; this paper suggests a reduction in the length of study abroad periods. Exchanges of shorter duration are increasing [6], but one challenge with exchange periods under three months is that they yield lower benefits than longer periods in relation to the development of skills and global awareness [7]. However, short-term mobility models may encourage and enable more students to engage in international travel experiences.

2.1 Focus area

In HE, international collaboration has become a key factor within many institutes’ development strategies. International experience is considered an important part of both academic learning and students’ personal development [4, 5]. Programmes such as Erasmus encourage academics to travel on short international mobility exchanges, typically between two and nine days, while students attend longer trimester exchanges of approximately three months’ duration. All participants have the opportunity to experience different teaching approaches and develop collaborative research links, while being exposed to new cultures and institutions. Several studies discuss Erasmus and its impact [2-5]. However, there is less research on the impact of shorter student exchange programmes. In this article, we explore the potential and benefits of shorter, more frequent international collaboration programmes with limited participant numbers per exchange as compared to the Erasmus programme.

3 A case study of carousel

This line of inquiry was researched through a case study [8] of a small international design exchange community named Carousel. This case study was chosen because of the nature of the research question and due to our experience with this case over several years. Carousel is an international collaborative student/staff workshop initiated in 2013 by three HE product design/engineering partners to provide short and intense international experiences to their respective students. In four years, it has grown to include seven HE product design/engineering partners representing schools across Europe. Each institution exchanges up to 15 visiting students and up to two members of the teaching staff with one partner each academic year; each subsequent year, every institution exchanges with a different partner institute, moving around the carousel, so to speak. Each carousel exchange has the duration of one week. The workshops mix student teams from both institutes, who then jointly engage in design briefs, often related to local culture and/or corporations. This case study is based on several visits over a four-year period, investigated through participatory research [9], interviews, and a questionnaire and is discussed here through theory on exchange programs.

4 Findings

The findings of the study reveal many advantages to working with smaller student cohorts. Students enjoy these short visits and emphasise the new learning skills and working methodologies they have learned, the cultural understanding they have gained, and the teamwork skills they have strengthened. The nature of the workshop, lasting only one week and having the characteristics of a “pressure cooker project” with a level of expectation that is higher than is justified by the time available, also benefits students in several ways. Students report that the short and intense period is very different from the programmes to which they are accustomed at their home institutes; the workshops force rapid decision-making and, therefore, quicker concept and creative idea processes. Students noticed differences in approaches toward problem-solving methodologies and differences in design skills used, such as CAD software, prototyping, and sketching processes. The students experienced fewer differences in the way teachers from different Carousel partners guided them through the workshop. When asked what they learned from the workshop, most students mention the cultural differences, resulting in different approaches to problem-solving and ideas which they believed produced richer project results.

Another key finding from this study investigating the building of a limited community of institutes, composed here of seven members, is that interactions and collaborations between members occur more frequently. This has led to an international collaborative research culture between some members of the Carousel teaching staff, as well as networking opportunity for students. Carousel has proven to be especially valuable to staff members by increasing staff contact between institutions. While it is not the main aim for Carousel workshops to lead to establishing longer Erasmus exchange agreements, the workshops have led to several-long term Erasmus agreements. Through Carousel workshops, institutes get to know new European partners, their design programme, and their staff. Therefore, it seems that Carousel primarily functions for students as an alternative to experiencing a learning situation in a foreign country, and

it secondarily leads to more students going abroad for long-term Erasmus exchanges or foreign master's studies. However, this increase caused by students' Carousel experiences is not large, but definitely noticeable.

5 Discussion

5.1 Staff experiences on Carousel and organisation structure

The fact that the main organisation of the Carousel exchanges lies with the actual teaching staff makes it less time-consuming and more flexible. It also makes the nature of the cooperation both very relevant for the curriculum and more personal. Some workshops offer opportunities for staff to work and collaborate more closely with students and their projects for an extended and/or uninterrupted time, compared to the more fragmented module structure and timetable at their home universities. It is also important to note that staff who engage in the exchange are removed from the day-to-day administration of their home institutes, which gives them more time to fully immerse themselves in the teaching and learning experience while abroad.

Participating staff have commented that they have been 're-energised' when they return to their own institutes; this also corresponds with experiences from Erasmus teacher exchanges and is not unique for Carousel. However, the important point about this is that, within a Carousel workshop, the staff and students engage in a complete project experience from start to finish; this is different from longer-term exchanges in which staff may not visit the exchange partnership, or, if they do visit, they only see a very small part of a larger project. Often students and staff returning from Carousel prepare a presentation and share the experience with their home institute after they return.

Feedback from participating staff reveal that the workshops provide a place for reflection; they gain the 'head space' to think about their own programme away from the day-to-day administration duties, which often require 'hands-on' management concerning programme development, staff line management, and general management of the programme.

Carousel has built a strong community of practice between participating staff, which in some cases has forged ongoing international research collaborations. An important consideration when considering developing and maintaining international connections is the size of the participating Carousel members, which impacts the frequency of repeat visits to those institutes. Carousel has seven member institutes, which has led to frequent visits between the same institutes and enabled participating staff to follow-up and develop ideas and discussions from previous trips. It is our experience that this model of working creates advantages for sharing best practices, developing programme content, and disseminating and testing fresh pedagogic practice and research. An example of this is a staff research community working under the title 'Work on the Move' [10], which was developed to capitalise on the opportunity of having participating academic design staff all together during Carousel week. Put simply, the students are assigned a design task, so why not do the same for the staff?

One of the challenges mentioned in regard to Erasmus is HE system compatibility [5]. This is clearly less challenging for a one-week exchange programme. However, from an organisation perspective it might be challenging to find time for Carousel visits due to tight schedules. One of the participating institutes noted the issue of organizing their workweek to accommodate a visiting workshop. The main problem was that their programme runs within a structure of shared modules with other programmes, which requires the cooperation and support of a number of different module leaders. As mentioned in the findings, Carousel workshops enable institutes to get to know new European partners and facilitate greater opportunities for sharing and broadening university international contacts. One example is the development of more formal, long-term Erasmus exchange agreements based on some of the new programmes introduced by Carousel. This would suggest Carousel also offers an opportunity for institutes to run a ‘trial’ of a new exchange partnership before committing to a larger or longer-term agreement.



Figure 1. Carousel in action in Zwolle, Nantes, Edinburgh and Oslo

5.2 The student experience and learning

One challenge for students when considering a long-term exchange is the difficulty in organizing the travel around part-time jobs and renting out their accommodations while they are absent. This is the major factor stopping students from participating. Within the Scottish institute, the international mobility model has been set at a target of approximately 800 places, thereby increasing the current key performance indicator of 200. In an interview with the institute’s global mobility manager, a number of challenges to long-term mobility engagement were identified, based on feedback from their students, including students’ concerns about having to give up part time jobs, caregiving responsibilities for family members, separations from partners, and funding challenges. On average, the cost of the Carousel workshop is approximately 400-500 euros for flights, accommodations, and any expenses for transport, access to museums/cultural events, and personal spending money. Students have commented positively on the value of the trip for the cost, as the trips are organised by the host to include a range of academically, culturally, and socially beneficial activities. The ‘value for money’ argument might seem a bit superficial, but it is an important consideration, because, regardless of country, financial issues are the most commonly identified barrier to long term studying abroad [5]. Around 29% of students withdraw from the idea of a long-term exchange because they think the level of funding provided by Erasmus grants is insufficient [5]. Barriers can also include difficulties like moving away from home or the home country for the first time; because the Carousel programme is only one week long, these challenges are easier to manage and are not a factor in preventing students from attending. As described in the findings, it seems that, to a large degree, Carousel is accessible to students and often functions as

an alternative to experiencing a longer-term learning situation in a foreign country. However, in several cases Carousel has stimulated longer exchanges. The students also talk to students at home about their Carousel experiences and this can affect whether or not other students wish to commit to a long-term stay at the institution. In the Scottish product design program, Carousel was initially offered to 3rd year students, with a few spaces open for both 1st and 2nd year students; this structure had the benefit of helping to promote and stimulate interest in the workshops earlier in the programme. Within the Scottish programme, we found that students who engaged in the workshop in earlier years were much more likely to engage in longer overseas exchanges when they were offered in students' 3rd year. A significant factor for this increase in participation was that returning students gave a presentation to their cohort about their experiences, which in turn supports the participants' social media feeds when they are away. That short stays can lead to longer exchanges corresponds with findings from research on the Erasmus programme [5] that states that students who have participated in short (1-3 weeks) international programmes are more likely to attend a longer exchange later in their studies. Furthermore, a survey related to Erasmus [5] shows that students might have been keener to participate in mobility programmes if they had been introduced to the opportunities at an earlier stage in their education. One example from Carousel is the following quote from a Scottish 3rd year student who is currently on a longer five-month exchange but initially engaged with Carousel in her second year:

“Good to do short Carousel experience in 2nd which give me confidence to apply for longer Erasmus trip in third year. One of the main reasons for this was Carousel which was the first time I was away from my parents and friends, which gave me confidence to know I could do it for longer.”

Furthermore, interviews with two Norwegian students showed that the Carousel trip had made them more aware of options for studying abroad and, as a result, they are currently applying to foreign MA studies.

There is little doubt that a long-term stay will increase the impact of the experience [5, 7]. Moreover, it is not likely that the students' experiences from one or two international one-week workshops will grant cultural competence and international competencies that equals those of Erasmus exchanges. However, these workshops produce results, and certainly they contribute far more toward international and cultural competencies than if the students had stayed at home. One student noted:

“I think the most important thing I learned this week was how to come to a compromise in a project where people have different opinions because of their different nationalities.” Another said: *“I learned that it can be very different to work with foreign people than expected. They have their own way of working [and] approaching a problem or perhaps even their visions on the world.”*

It is also important to mention that the nature of a Carousel visit differs quite a bit from a regular study trip due to its workshop character and cross-international focus. To strengthen the effect of these competencies, it is important to structure the Carousel week to offer both studio and external industry visits as well as social events. This

makes the week a diverse and rich experience with greater access to insights into working and living in another culture. Observations showed a noticeably richer cultural and international design awareness to their subsequent design project due to students' exposure to international travel, collaboration with older students, and cultural events organised with the host universities. Furthermore, students gained a perspective on their host institutes' learning and teaching styles to help them put their own experiences into context and see the opportunities their own institutes offer them. For example, different institutes may use different design methodologies, place more focus on physical workshops, or push prototyping using 'quick and dirty' design methods or digital moving image. One student said: *'It was at a much higher tempo than we usually do projects.'* Observation also showed the different 'pace' of learning between institutes, and that, in the context of a one-week project, the process was more important than the outcome. Here, students had little time to think about failure and were empowered by having to make decisions quickly and act on them. Students have also noted the benefits of collaborating with students with different skill sets from different institutes and different approaches to learning. One student said:

'I think this [different knowledge and skills] is one of the best aspects of being mixed with other people who has other studies or that has been taught in a different way, because our skills are completely different, and when working in groups, it is easy to divide the tasks and also to learn new tools to do projects.' Another student said: *'I have learned new tools and software to edit sketches that I didn't know before.'*

It is important to comment that the students also found many similarities in their skills and knowledge. The one-week structure of Carousel means that learning is brought back into the participating students' cohort the week they return home. This keeps the experiences fresh and relevant, and the knowledge acquired can be disseminated almost immediately. This differs from longer-term exchanges, in which, in the example of the Scottish institute, long-term mobility occurs at the end of third year, so returning students enter their final year after a three-month summer break when the experience is no longer fresh.

6 Conclusion

When reflecting on the experiences between Carousel and long-term exchange programmes, one of the main benefits has proven to be the impact on participating staff experiences and development. The Carousel structure encourages staff to participate in the workshop collaborating with the host teaching staff. This is a great benefit compared to long-term exchanges, where staff may not have the opportunity or be required to visit students. Very rarely, if at all, is there an opportunity to engage in a complete student project abroad. In Carousel, every participant contributes to the project in different ways, which in turn generates conversation and discussion between staff. These interactions have developed research projects between different host participants which have been disseminated in international pedagogic conferences and journals. Furthermore, Carousel's small number of collaborators and the frequent visits between members means there are greater opportunities to build stronger relationships and ongoing communities of practice and project development. In addition to building longer-lasting relationships, the workshops generate momentum to reflect on and

develop experiences for future visits. It has been the practice for the workshop hosts to source local industry or relevant collaborators from the community for the workshop week. The fact that each member will host and visit each year creates an incentive to plan new workshops, and, as a result, a wide network of industry makers and studio collaborators is constructed. The workshops use external local venues/locations in addition to the host studio environment. This enables visiting participants to experience local culture rather than simply spending a week in a familiar studio environment similar to their own institute. This experience, both working with foreigners and experiencing their culture, enhances international competences, although Carousel cannot influence the same quantity of international competences as a long-term Erasmus exchange. Hence, Carousel is not an equal alternative for longer student exchanges but an additional option, which provides more opportunities for larger numbers of students and staff to participate. The structure of Carousel reduces financial costs and duration away from home when compared with longer exchange programs. From an administration perspective, it has proven to be more manageable when integrated into curricular timetabling. These benefits address major barriers that prevent participants from wanting to participate in international exchanges. The agile, short, and frequent structure of the workshops also means staff can adapt, develop, and quickly respond to both positive and negative experiences, and feedback allows administrators to constantly develop the programme in line with changes in culture, commerce, technology, and pedagogic methodologies. In the interview with the Scottish institute's global mobility manager, a number of challenges to long-term mobility engagement were identified. However, he also expressed that some benefactors to the university who contribute funding for the purpose of international mobility are not convinced that short-term mobility agreements provide sufficient cultural benefits and impact to the students. In light of these issues, the Carousel structure was praised for diversifying the mobility model in such a way that international educational mobility has become accessible to more people and for demonstrating an effective approach for increasing the institutes' mobility participation numbers.

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