Designerly Learning: Workshops for schools at the Design Museum

Helen Charman, Head of Learning, Design Museum 2010

Abstract

This paper presents qualitative research recently undertaken by the Head of Learning at the Design Museum. The research explores how learning in the museum's workshop programme for schools is conceptualised by the museum educators who devise and teach on the programme. The study is framed by an epistemological stance of social constructionism, in view of its relevance to respondents' accounts of the social, inter-subjective nature of learning within the workshops. Based on findings from five semi-structured interviews, the localised nature of the case study considers the distinctive characteristics of learning within a typologically specific museum amidst debate in the cultural sector over the role and status of museum learning more generally. A brief literature review summarises features of professional design practice and of 'design thinking' salient to the study, in particular the proactive engagement of design in its real-world context, and a systemised account of designers' cognitive processes. The interview data is then presented across three themes. These themes are: shared perspectives on the *content* of learning; on the *environment* for learning; on the *processes* of learning. Key findings from the interviews are synthesised into an outline of an 'ideal-type' workshop which sets out the core phases and behaviours therein. The term 'designerly learning' is coined as a concept that can be adopted to 'organise the experience of learning' in the school workshops at the Design Museum (Pring, 2000:10). Notably, designerly learning seeks to model characteristics of design thinking and practice to the learner through the experience of a workshop using the museum's handling collections. Arguably, it is a concept particular to this institution, rooted in its distinctive disciplinary context of design. In conclusion a note of caution is sounded regarding the theoretical abstraction of the concept of designerly learning, notwithstanding its educational and professional value as an "adequate, simplifying paradigm" of learning (Cross, 1992).

Key words
design, learning, museum, content, process, environment

Introduction

"Learning is a process of active engagement with experience. It is what people do when they want to make sense of the world. It may involve the developing or deepening of skills, knowledge, understanding, awareness, values, ideas and feelings, or an increase in the capacity to reflect. Effective learning leads to change, development and the desire to learn more."

(MLA, 2004:1)

The definition of learning given by the Museums, Libraries and Archives Council in 2004 is intentionally broad and open. It aims to be applicable to any of the three types of cultural organisations listed above that have learning within their remit. As such, it is extremely useful in giving a global overview of learning, against which institutions can develop more localised understandings. Museums, libraries and archives are not all alike and nor is their educational provision. Museums in particular are the most widely differentiated of these organisational typologies. They are culturally, historically and politically distinctive sites for teaching and learning, shaped by, amongst other things, specialist disciplinary interests, collections and display policies, and funding agreements. Indeed, one might argue that it this very diversity that gives the sector its rich educational appeal.

As a move to refine the educational heterogeneity of learning in museums, as well as to afford the education team at the Design Museum further insight into their practice, this research focuses on how learning is conceptualised by educators on the Design Museum's workshop programme for schools. The study was devised and carried out by the Head of Learning at the museum with the aim of better understanding the characteristics of learning in the workshop programme, and the extent to which these might be considered distinctive to the Design Museum. In total, five semi-structured interviews took place. Four were with educators who devise and teach on the schools workshop programme and one with a design education consultant, as follows:

Respondent A, a Learning Officer at the Design Museum and a practising designer-maker and curator, with a professional background in Adult Education and a BA degree in Fine Art.

Respondent B, a Learning Officer at the Design Museum, has a BA degree in Graphic Design and a professional background in book illustration and set design.

Respondent C, a Learning Officer at the Design Museum, has a BA in Decorative Arts and at the time of the research was currently their MA in Education, Culture and Society.

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Respondent D, a Senior Tutor in Product Design at the Royal College of Arts, London, who was consulting for the Design Museum on exhibition and learning resources.

Respondent E, a freelance museum educator, has a BA degree in Fine Art and a PCET qualification in Art and Design, also a practising designer maker.

Background: The Design Museum

The Design Museum is an independent, charitable organisation located on Shad Thames, east of Tower Bridge. It was established in 1989 in a refurbished banana warehouse, under the auspices of Sir Terence Conran whose ambition to 'do something significant for design education' (Bayley, 2006) had given rise to the Boiler House project seven years earlier (1982-1987). The Boiler House was a temporary exhibition space at the Victoria and Albert Museum that successfully introduced contemporary design and its concomitant debates to its host institution. In establishing the museum on Shad Thames, Conran's intention was to put modern design at the centre of contemporary culture, endorsing its cultural value and the importance of creativity found in all forms of design, both economically and as a way of comprehending a rapidly changing society. The idea for a new museum of modern and contemporary design was to celebrate, entertain, inform – and, crucially, to educate. Over the last 21 years the museum has struck a balance between raising the profile of design and providing a critical exploration of design through exhibitions and learning programmes. Significantly, this exploration is coupled with a dynamic engagement with design as professional practice and a key component of the cultural economy. Currently the Design Museum operates on a programming model akin to a European 'kunsthalle', dedicated to exhibiting contemporary design in all its forms through a rolling programme of temporary exhibitions that span the breadth of design, encompassing industrial, fashion, architecture, product, service, automotive, digital and graphic design. The principal activity of the museum as stated in its objectives is:

> "to advance the education of the public in the study of all forms of contemporary design and architecture in the historical, social, artistic, industrial and commercial contexts."
> (Design Museum Memorandum of Association, 2009)

The exhibitions programme features key figures in design history over the last century, contemporary design and designers, emerging talent, and thematic shows. It provides a hub for learning that promotes critical engagement with design in the museum context, connecting design education in schools with the real world of professional design practice.

Literature review: Professional contexts and design thinking

The professional practice of design and the professional identity of the designer appear to be in flux. The reasons given are manifold and complex. Headline influences include globalisation, sustainability, the explosion of communication interfaces and rapid developments in technology, coupled with the emergent economic competition posed by the growth of design sectors in the Far East. A shift from a silo-based professional practice (in which the designer inhabits and is circumscribed by a single, specialist field such as product design), to a multi-disciplinary, networked professional practice (such as interaction design which includes the convergence of formally separate areas such as product, interior and graphic design) is also taking place. A discipline in a state of transition tends to engender self-reflexivity and critique, as evidenced at *Intersections* 2007. This conference brought leading thinkers in professional design together to explore how design is evolving and how this evolution affects its relationship with other fields of creative and business practice. Notably, the conference summary highlighted the changing role and identity of the designer as part of a rapidly moving world. One such prospective identity was proposed as the 'Designer as Strategist', which sees the designer emerge from the micro level of addressing a particular design problem in business to become increasingly involved in the bigger picture of design innovation in its social and environmental context, a touchstone for 'the what and why of innovation, and not just the how', a way of practising design which pro-actively and urgently engages with social and environmental concerns (Myerson, 2007:6). This notion was to prove fertile for conceptualising the content of learning about design at the Design Museum.

The second key area of interest is that of 'design thinking'. Formerly known as Design Methods, design thinking has its roots in the movement that looked at providing a systemic method to the intellectual and creative design process. The aim was to make the design process more readily accessible and easy to understand, and through so doing, to facilitate cross-disciplinary work, for example with anthropology and psychology (McDermott, 2007:88). Initiated at Ulm, the German School of Design which took up the mantle of the Bauhaus in its curricula focus on design for industry, research into design methods crossed the channel and found its advocates in Britain in the 1960s at the Royal College of Art through the work of academics Bruce Archer, Christopher Jones and Nigel

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Cross. A summary review of the key aspects of design thinking provides a background against which to read emergent conceptualisations of learning within the Design Museum workshop programme.

In *Research in Design Thinking* (Cross, Sorst and Roozenburg, 1992) patterns in design thinking are identified across three key areas; how designers formulate problems, how they generate solutions, and the cognitive strategies they employ in doing design. Problem formulation and solution generation are presented as two sides of the same coin, which designers explore simultaneously, using the languages of drawing and modelling. The 'significance of representational languages to problem-solving ability' is understood and accepted as the most important general finding from studies into design thinking (Eastman, 1970). Of these, drawing is the primary medium for modelling the language of design. This modelling becomes a quasi conversational process between the external representation and the designer's internal cognitive model of the problem-and-solution.

> "[The designer] shapes the situation, in accordance with this initial appreciation of it; the situation 'talks back' and he responds to the back-talk."
>
> (Cross, Sorst and Roozenburg, 1992: 43)

Thus design thinking is a recursive (or as Cross terms it, a 'commutative') process in which the designer's attention oscillates between problem-and-solution and in doing so enables a better understanding and definition of both.

A second feature of problem formulation is that designers use 'alternative solution conjectures' as the means of developing their understanding of the problem. If the solution does not arise directly from the problem, designers tend to emphasise the role of intuition or creativity in its generation. Creativity is cited as an essential element in design thinking. Somewhat counter-intuitively, creativity is facilitated through imposing additional constraints. Such an imposition narrows the solution space and thereby helps to generate solution-focused ideas. Often this constraint is on the geometrical form that the new design should take. Cross cites research by Levin which describes this as akin to adding a 'missing ingredient':

> "The designer knows (consciously or unconsciously) that some ingredient must be added to the information that he has already in order to arrive at a unique solution. He has to look for the extra ingredient, and he uses his powers of conjecture and original thought to do so."
>
> (Cross, Sorst and Roozenburg, 1992:45)

The final pattern detected by Cross is the particular form of reasoning used by designers, that is, their prevalent cognitive strategy. This has been subject to a range of terms. In its speculative nature it is termed 'abductive', a term which draws on the work of the philosopher Pierce for whom abductive thinking is that which deals with the hypothetical, the 'what may be' rather than the 'what is'. Later research suggests instead 'recursive reasoning' or 'reductive reasoning'. Amidst such speculation, Roozenburg concludes that the most apt term for the particular cognitive strategies used by designers might simply be 'design reasoning'. This reasoning assumes the design problem is ill-defined and necessitates a solution-focused approach inherent in which is the back-and-forth propagation of ideas.

It is not intended that this brief literature review mask the complexity and creativity of design thinking nor recent developments in the field. Significantly, the lack of an adequate, simplifying paradigm of design thinking is cited by Cross as an inhibitor to the transfer of knowledge between research into design education and its practice. Of relevance for this research is the extent to which these two ideas –the proactive engagement of design in its real-world context, and a systemised account of designers' cognitive processes, might usefully inform conceptions of learning within the Design Museum workshop programme. The question can then be explored as to whether the distinctiveness of the museum context offers an opportunity to develop such an 'adequate, simplifying paradigm' for learning.

Data presentation
This section explores key characteristics of learning emerging from analysis of five semi-structured interviews, based on workshop provision at the museum with the respondents detailed above. Data presentation is structured in relation to the following three themes:
1. The *content* of learning at the museum – this includes subject matter, ambitions and values.
2. The *environment* for learning at the museum – this includes institutional and architectural.
3. The *processes* of learning through which learners encounter design in the museum's educational programmes – this includes formats and modes of engagement.

The formal learning audiences for the workshops are primary (Key Stage 2) and secondary (all key stages). The workshops are devised to promote creative and critical approaches to design and use the museum's handling collection to engender experiential learning.

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'Getting a piece of the world': shared perspectives on the content of learning

The following shared perspectives on the content of learning in the Design Museum workshop programme emerged through the research:

- Design is everywhere. It affects, and is embedded in, all aspects of everyday life.
- An emphasis on design history as an ideas-led process of evolution rather than an object-based discipline in which the design object is viewed as an end in itself.
- The role of the designer is to engage with socio-environmental-political agendas concerning the impact of design today.

In the Design Museum's mission statement, the institution commits to celebrating the role of design in everyday life. In learning about design, the focus is on drawing attention to the ubiquity of design and its often understated presence in everyday life, as both object *and* process. Celebrating the impact of design through the everyday object is achieved through workshops which draw on the museum's Handling Collections comprising design objects which facilitate the everyday rather than the unique: chairs, mobile phones, cosmetic packaging, lighting, textiles and everyday eco products such as bags and vases. As respondent E states when describing design, 'it's not academic, it's just about life'. A workshop based on a selected Handling Collection will raise the profile of design, drawing close attention to how integral design is to life by focusing on the life-cycle of an everyday object from initial idea to realisation as reified object. Design as object is not a finite proposition; learning must necessarily consider the ongoing affect of the object in the world. That is, the design object does not simply solve a problem (the facilitative aspect of design) but it also engenders a situation and an experience (the affective aspect of design). Thus, as well as describing the facilitative role played by design, respondent A also points out the active impact of design; 'it's much more about lifestyles, and how we develop through design, and the power of it to control and shape our world.' If design as process plays a silent, invisible role in everyday life then the workshop programme gives it voice, through investigating how design operates as an active, life-shaping process which surrounds us both conceptually and in practice, as described by Respondent D in detail.

"Young people use design in their everyday life. They are exposed to service design left and right…their oyster card, a lot of the online stuff that they use. They are using design that they don't call design. They wake up and think …I'm going to school, then I'm going out then I'm going to the gym so you kind of conceptualise your

day and you pack what you might need during that day and this is not that far off from a design process. People do these things, they think about the situation, which is the *context*, they think about what they have to work with, which is the *materials*, and they think about *opportunities* and if you actually break that down to professional terms it's a design brief."

This championing of the everyday, at the level of both design object and process, adds up to the experience of the learner 'getting a piece of the world' (Respondent C).

The second shared perspective to emerge was that of design history. The workshop programmes offered by the museum do not offer design history as a discreet subject for study. Instead, it is woven into learning in an applied manner in which the history of design is understood as a process of evolution through significant, catalyst moments in product or service development, providing a way in to learning about significant figures in design history. The learner encounters design history through close study of pieces in the Handling Collection which have been carefully selected to show design history in action, for example through use of a new manufacturing process or new material or through identification of a new target audience which further evolves significant earlier works. Understanding design as the evolution of ideas plays out as learners explore ways to evolve a design. As Respondent E explains,

"…very rarely does a totally original idea occur. But what does happen is that old ideas comeback and are improved on with new ideas. So if we find something that is slightly wrong with the product, whether it's in terms of materials, functionality or aesthetics, improving it can then become be a new product."

Thus the new product is encountered 'in conversation' with its antecedents and the process of moving from one to the other creates a sense of dynamism and narrative within design history.

Within the typological specificity of the Design Museum, the stories that are explored and created by learners extend further than the discipline of design. The socio/environmental/political contexts which inform potential and final design decisions are multifarious and culturally embedded; in society, and in technology. The ongoing contexts for design, from initial idea to manufacturing process to consumption, are key considerations within the product evaluation process. Respondent D describes design history as 'lines of provision'.

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"Another layer of learning is to do with lines of provision. Where something starts, why it's made, and how it's made, how it's used, how it's discarded, how it influences the next thing – so six stages. It's design history as lines of provision because things don't stop."

Within the concept of learning that emerged from the interviews, a nascent, evolving notion of designer identity stood out. Respondent D described how Charles Eames is famously quoted to have said that the designer should be the perfect dinner party host, in the sense that he should anticipate all needs of the guest. This notion of designer-as-host shifted dramatically in the 1980s and 1990s with the advent of the celebrity, star system that ushered in the notion of designer-as-guest. Arguably, the designer-as-guest brings everything with them but asks that you change your life to suit their ideas and not the other way round. In the opening decade of the 21st century a further notion of the designer is taking root, bringing a more participatory flavour to the table. This notion sees co-dependency as the most important factor. This co-dependency plays out across a variety of contexts, including consumer psychology, environmental sustainability and networked communities of practice.

While co-dependency has always been a feature of design practice (the designer can never be divorced from their multifarious contexts – particularly that of consumption), there is a sense that it is now coming to the forefront. The implications for learning in the museum is not so much to debunk the idea of the designer as 'star' or 'host', but rather, to understand the designer as a co-dependent professional through enabling the learner to explore the importance of the designer's relationship with the client, the producer, and the user. It is about introducing a social agenda to design, a citizenship of design. Understanding the designer as a co-dependent professional also has implications for how design itself is understood. Definitions of design are many, and arguably it is the responsibility of the Design Museum to draw learners into conversation about this rich plethora of definitions, and by doing demonstrate the dynamic, sometimes conflicting, characteristics of the field of design. It is also the responsibility of the Museum to acknowledge that there is a politics to ascribing value to one definition over another. This is of particular note in relation to the second of the three main themes, that of the Design Museum as a distinctive environment for learning, a place that offers space for reflection and critical engagement with ideas.

'A Place for your Brain to Breathe': shared perspectives on the environment for learning
The following shared perspectives on the Design Museum

as a distinctive environment for learning in the workshop programme emerged through the research:
• It is primarily a museum of ideas as of objects.
• It endorses design by taking it seriously and fostering a critical approach.
• It is a 'mind-opening, magical resource', a place to see design differently.

The first of the shared perspectives sees this environment as primarily a museum of ideas reified into resonant objects. Such emphasis on the museum as an ideas-led environment, rather than an object-centric place *per se*, is rooted in a philosophical shift that has been perceived to take place in the museum concept more broadly, manifest in a shift in emphasis from the creation or delivery of knowledge based on a collection-centric connoisseurial approach to a constructivist approach which priorities the engendering of the subjective response of the visitor. This latter approach is described in the DCMS report 'Fresh Minds: Culture on Demand' (2007) as part of a drive to increase visitor numbers.

"A fundamental shift from a 'collection-centric' to an 'audience-centric' approach has been shown to help in sustainable audience development."

Setting collection-centred connoisseurship against audience experience is a potentially false dichotomy about which caution should be exercised. Nonetheless, space for exploration of the personal connections and real-world contexts that shape production and consumption are seen as an intrinsic component to the workshop programme, that of contextual learning. The object is approached with a critical and questioning attitude that opens up a multitude of insights into technology, society and culture. This critical, questioning attitude is seen as something particular to the museum environment – indeed, it is understood as a responsibility of the institution to foster a critical engagement with design. Respondent A suggests that one of the principal questions to ask of a design piece is:

"…what kind of society produces a thing like this? And through that question you can see how advanced the society is, the values of that society, some of the economic conditions of that society."

Critically exploring design enables the design object to be interpreted as an active, productive agent of culture that can be subject to a plurality of meanings depending on the contexts within which it is investigated. This has the potential to give the learner a more personal way in to engaging with the design object, enabling them to reflect

on their active and ongoing relationship with design, to make connections and identify relationships as they are invited to consider the impact of design on them and the world. A contextual approach can 'retune' the learner's experience of design, and the museum environment is seen as being a particularly effective place for this to happen. Partly this is to do with the Design Museum occupying an institutional niche that offers the visitor a depth of knowledge about design in an exhibition context that cannot be found elsewhere. One might describe this as specialist, as opposed to contextual, learning, and is a vital part of the concept of learning, as Respondent D claims.

"Then there is a layer of the things that this particular museum knows more about than others, which is to do with the identity and the authority of the particular museum."

The specialist identity of the institution is a vital aspect of the second shared perspective, in which the existence of a museum devoted to modern and contemporary design confers cultural status on the field of design. It asks the visitor to take design seriously, and opens up the world of the designer to the learner. The significance of the professional practice of design in the learning concept cannot be underestimated. Partly this is to do with the education department's mission statement which includes the ambition to 'nurture the next generation of designers'. The significance of the museum's exhibition policy to showcase emerging designers, for example through its 'Designers in Residence' programme which turns the public spaces of the museum over to recent post-graduates in design for their design-based interventions, provides fertile ground for students to imagine their future professional selves:

"The fact that the museum has changing exhibitions and it's about recent and modern design is important for students to know. I will always tell the kids these are people a few years older than you…it's tough, but if you follow a career path into design and you go to university and study design you could end up in a show like this. It's quite a grand thing to see, but I want them to see that it's a reality." (Respondent E)

The importance of opening up the world of professional practice to the learner is inherent in the learning concept that foregrounds design as process. Situating design within professional practice necessarily means that the conditions of production – starting with what inspires or creates the need for the design object or service – and the conditions of consumption must be explored. It is a way of

broadening the idea of design to include the social, economic and political contexts within which design operates, and in doing so gives design a sense of relevance and urgency, as outlined by Respondent B:

"How does design happen, what are the methods, how do people learn to be designers, what inspires them, how has it changed, what are the responsibilities of designers in today's fast moving, disposable world?"

For some learners this contextualised and contemporary approach to design may be unfamiliar. The way in which the Design Museum can bring the learner to design in a fresh or unfamiliar way is at the heart of the third shared perspective. Respondent C describes the Museum environment as a 'mind-opening, magical resource':

"The pure, clean white spaces allows your brain to breathe, your ideas to bounce around as you look at the beautifully designed objects – compared to a classroom environment, this place is relatively monastic, uncluttered. It's a conceptually new space – one in which they have space to play around with their ideas and find inspiration."

While the magical 'awe and wonder' inducing aspect of the museum environment is not peculiar to the Design Museum, its rolling 'kunsthalle' model of up to three simultaneous temporary exhibitions, in which different fields of design rub shoulders with one another, presents very rich content for the visitor which can open up fresh perspectives and be a source of unexpected inspiration, reflected on by Respondent A:

"The dynamic of the temporary exhibitions jostling one another…it's about lulling the audience into not having a preconceived response to what they're looking at. The museum presents something new, something unexpected."

The visitor can choose to see a specific exhibition or visit them all. At the time of writing this paper, a visitor to the Design Museum could experience the best of thirty years architectural model making by the architectural firm Rogers, Stirk and Harbour; the surreal, whimsical and dreamlike fashion photography of Tim Walker and the minimalist, utilitarian product designs of product design firm Industrial Facility – a richly inspirational environment for learning about design.

Yet inspiration is found not only through the rich content of the temporary exhibitions themselves. It is also related to the architectural quality of the museum building itself.

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The Design Museum has been described as the 'perfect monument to Bauhaus' (Bayley, 2006). It is spacious, airy, clean and light, and presents a blank canvas upon which exhibition designers reinvent the museum for each show. Thus the notion of the museum as a 'place for your brain to breathe' may be as much to do with the architecture of the institution as it is to do with content. Respondent B finds this a particularly valuable aspect of the learning concept;

> "Even the journey to the Design Museum, the walk along the river from London Bridge or Tower Bridge, it gives some space to the student, they can start that de-cluttering process, and when they arrive they enter the airy glass panelled riverside hall and already it's like their brain has a place to breathe."

The idea of the 'learner journey' begins even before stepping foot in the museum. Acknowledging and building on the experiences that the learner brings with them is a vital aspect in the third and most extensive of the shared perspectives that emerged through the interviews, that is, perspectives on how learners encounter design.

'Happy Mistakes': shared perspectives on the processes of learning.

The following shared perspectives on the processes of learning within the Design Museum workshop programme emerged through the research:
• The encounter is an active, experiential, exploratory process that draws on learners' prior experiences.
• Pedagogical approaches are pre-dominantly facilitative and constructivist, enabling learner-initiated questions, independent thought and interaction. Some measure of expository teaching takes place, for example when key terms are initially introduced.
• There is a balance between learning about and learning through design.

In acknowledging the learner as someone who brings with them a rich tapestry of memory, associations and prior knowledge about design, the learner's encounter with design aims to make tacit, prior knowledge explicit. This process is at the heart of learning;

> "Learning in the result of both experience and interpretative processes and is a continuous endeavour. The processes of learning occur continually as we use our prior knowledge to negotiate the world, and in doing so we learn new things and challenge, confirm, or deepen what we already know."
> (Gallagher, 1992:23)

The idea of engaging prior knowledge in active learning translates into an approach that is 'minds on' as well as 'hands on'. For some, the challenge lies in creating a learning experience in which the learner can conceptualise how a design piece would facilitate a situation, or solve a problem, in practice. Being able to handle a product or create an architectural model is only one part of the active learning approach; it is as much to do with being able to put oneself in the mind of the user – a kind of empathic learning – as it is actually to engage with the making or investigative process in a tactile way.

> "I ask students to imagine going through the process of what you'd do. So acting out and imagining and within that you can draw out any health and safety issues, are there any particular people who might find it hard to use. For example a chair that's very low to the ground, you imagine that you your granny, how's it going to be for her, with her dodgy knees, or imagine you're a small child, are you going to fall out of it…it's a very imaginative process which might not immediately seem obvious when you think about 'Product Evaluation'."

Bringing imagination and empathy to bear depends on the extent to which the learner can tap into memories or associations, or can draw analogies from their experience. Respondent C outlines a strategy for enabling experiential learning:

> "If we're working with the Chair collection, I ask them to think about all the different kinds of seating they have used on their journey to the Design Museum today…which did they notice, or like, or dislike…what can they share with us about this? It's so commonplace and yet so full of ideas."

The emphasis on active learning through the engagement of prior knowledge or experience is an inclusive strategy that has the potential to be all encompassing, as Respondent E explains:

> "because of bits and pieces of useful knowledge they've learnt at school, and some things are really quite obvious, they can't always make connections, it depends on the object, some of them don't really reference anything, but other times, there are some objects which we've got that don't reference art and design movements, but they might be inspired by nature, or they might be inspired by the teletubbies, or something else that they do have access to. And that's how they make what they are looking at meaningful for them."

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In learning theory this active, meaning-making approach has been widely debated and defined under the rubric of constructivist learning, the second of the shared perspectives. In von Glasersfeld's (1990) radical constructivist conception of learning, teachers play the Socratic role of a 'midwife in the birth of understanding' as opposed to being 'mechanics of knowledge transfer'. Thus constructivist learning is defined against behaviourist learning in which the teacher's role is, somewhat stereotypically, to dispense knowledge into the learner's mind, seen as an empty vessel, a *tabula rasa* to be filled or as a mirror reflecting reality. Although it has its limitations, particularly in its reliance on a transmission, didactic approach which is largely passive and teacher-directed, a degree of behaviourist learning is of value and can be found in the learning concept at the Design Museum, particularly with regard to how the workshop leader equips learners with the tools – the key design based terms – to explore a piece of design. However, for the most part the leader sees their role as that of providing students with opportunities and incentives to build up knowledge (von Glasersfeld, 1990) based on their ideas and responses to a piece.

"I want them to do the work, so I get them to work together to list some of the things they could use as categories to analyse a piece and they will come up with things like colour, shape, size, all of those obvious things. So giving students some key tools to understand what we're looking at and to formalise the way they talk about it, they do it anyway on their own terms, but you have to bring a wider vocabulary to their attention consciously. So they establish the categories first and then I give them time to go through them and make notes, letting them organise their work how they want to, and then I give them some new terms for them to work with."

In this the leader is the facilitator, or as Mayer describes them, the 'guide', with the learner as 'sense maker'. The social, dialogic character of the intensely discursive exploratory phase of the workshop calls to mind Vygotsky's theory of social and situated learning (Vygotsky, 1978). The process of meaning-making, or sense-making has been widely explored in the literature on constructivist learning in museums. Hooper-Greenhill underlines the importance of the learner being able to place an object or an idea within a pre-existing framework of understanding:

"To assign significance to an object means bringing the object into a worldview; for individuals, it means fitting the object into an existing scheme of knowledge, placing it in a meaningful cognitive pattern."
(Hopper Greenhill in Genoways, 2006 :236)

Thus the workshop situation aims to encourage the learner to explore design objects through drawing on their own 'meaningful cognitive patterns', be they references from popular culture or the embodied experience of travelling to the museum itself. This is not to say that the entirety of the learner's encounter with design is constructivist in character; more expository approaches are on occasion necessary, as respondent E explains;

"I very much hope I'm enabling. I don't like to tell. I like students to arrive there and I love it when they arrive at something I haven't thought of. But there is a balance, sometimes they'll miss something crucial and I can't let that happen, but on the other hand I'd rather they came out with as much as they can without me, or with my nudging, rather than me telling, and then I will tell them – and I might know something about the product which they wouldn't know, which will help them with this as well."

Alongside the hybridised pedagogies of constructivist and expository teaching, two distinct processes are at play, which are summarised in the final shared perspective on the learner's encounter with design. The first process is learning *about* design; the second is learning *through* design. Learning about design involves developing a vocabulary for analysis of design, which as discussed above, is developed between the facilitator and the learner. This analysis includes the look of a piece of design, its materials and its function, and issues around consumption and the impact of the design piece in more detail – based on the understanding that manufactured goods include more than information about formal shapes; they also include an expression of ideas and myths about the world in which we live. All workshops give learners the opportunity to explore and experiment with a range of materials and techniques. This takes a relatively unstructured form that finds its analogy within research on 'design thinking' as the process of abductive thinking, that is, space to explore and deal with potentials rather than certainties. Within this the possibility of failure is ripe, and is viewed as an essential component of the design process. Respondent C refers to this as 'happy mistakes', with the emphasis placed on the process of exploring and experimenting with materials and methods rather than on producing a complete, finished product.

"This is because a mistake is actually a positive thing within design…because within the design process you have to allow for the unexpected."

Indeed, for respondent A, the ideal scenario within the experimentation phase of a workshop is an entirely open

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one, in which thinking happens through making. The learner doesn't know what they are making, things are changing while they are doing it, and this is posited as a highly creative, highly design mode:

"After the more structured evaluation discussion, there's the other side of design where it's about creativity and exploring everything in a free and random matter, you

know, let's just explore what we're doing without really knowing what we are doing and from that comes some ideas and information that can be put into a much more formalised design process at a later stage."

The second key process involves learning through design. In this the critical approach is paramount: through discussion and debate, ideas about design should involve
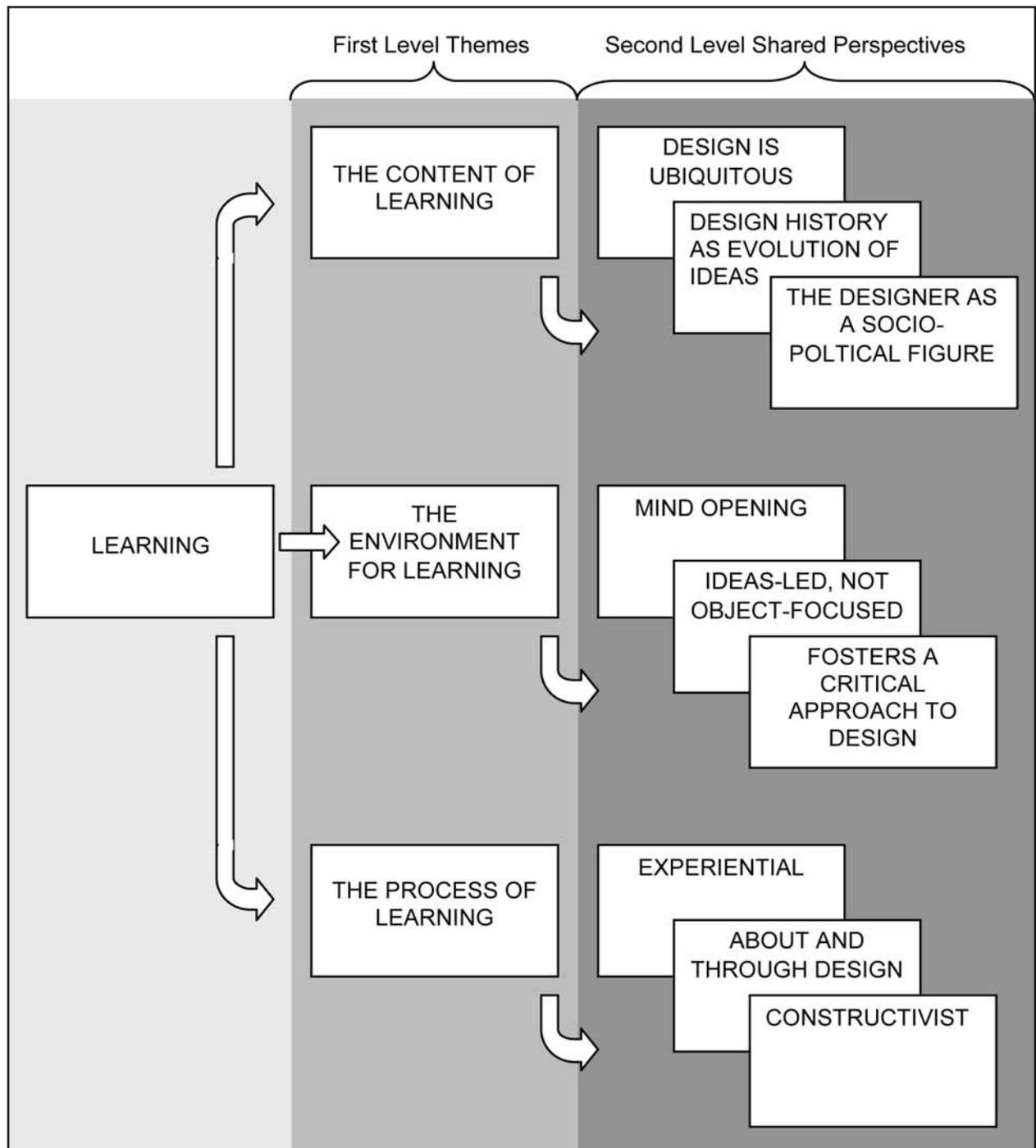

Figure 1. Summary of first level themes and second level shared perspectives

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the wider world and the place of design therein. A critical and discursive approach is promoted by facilitating discussion regarding the look of a piece, its materials and the manufacturing processes involved, its function, its target audience and potential impact on the world. Taking the area of materials and manufacture as an example, questions might be asked such as how do you think it is made, not only physically but what do you think influenced the design, why is it round, why is it this height, why does it have a curled lip, why is the handle on the left? At one level these questions can be answered by referring directly to the functionality of the object. But a second level of more critical questioning is then introduced which asks the learner to consider *why* the designer reached a particular conclusion: was it copied or was it designed for the first time, if so what necessitated or inspired the design and what does this say about the context within which the piece of design will be consumed – and so on. Respondent E sees the critical approach as one of opening up the learner to a consideration of future possibilities for design in the widest context, that of life itself;

"You can think critically, and it's about thinking about your own work, as well as evaluating another product. Thinking critically makes your horizons wider in terms of what's possible, and for me that's the critical thinking…not just about design but about how we live."

In summary of the above discussion and analysis, Figure 1 sets out the first level main ideas and second level shared perspectives gleaned from the analysis of the two data sets, the *IAC* (1988) paper and the interviews.

Conceptualising 'designerly learning'

This section considers how learning is engendered through the structures and behaviours within the Design Museum workshop programme. The concept of 'designerly learning' is proposed as a way in which to conceptualise this learning. Figures 2 and 3 represent the three key phases and behaviours of a typical workshop for schools, with an accompanying description of an ideal-type workshop composed from the interview analysis. The diagrams distil the core ideas concerning the process of learning into a visual representation of an 'ideal type' workshop with which, arguably, it is possible to draw parallels with the 'recursive' or 'commutative' nature of design thinking discussed by Cross. While the emphasis is on the processes of learning, it is intended that figures 2 and 3 be read within the context of the other shared perspectives, the content of learning and the distinctiveness of the Design Museum as an environment for learning.

The 'ideal-type' workshop

The 'Exploration and Evaluation' phase focuses on critical analysis and observation of design pieces from one of the museum's seven Handling Collections (Folding Chairs,
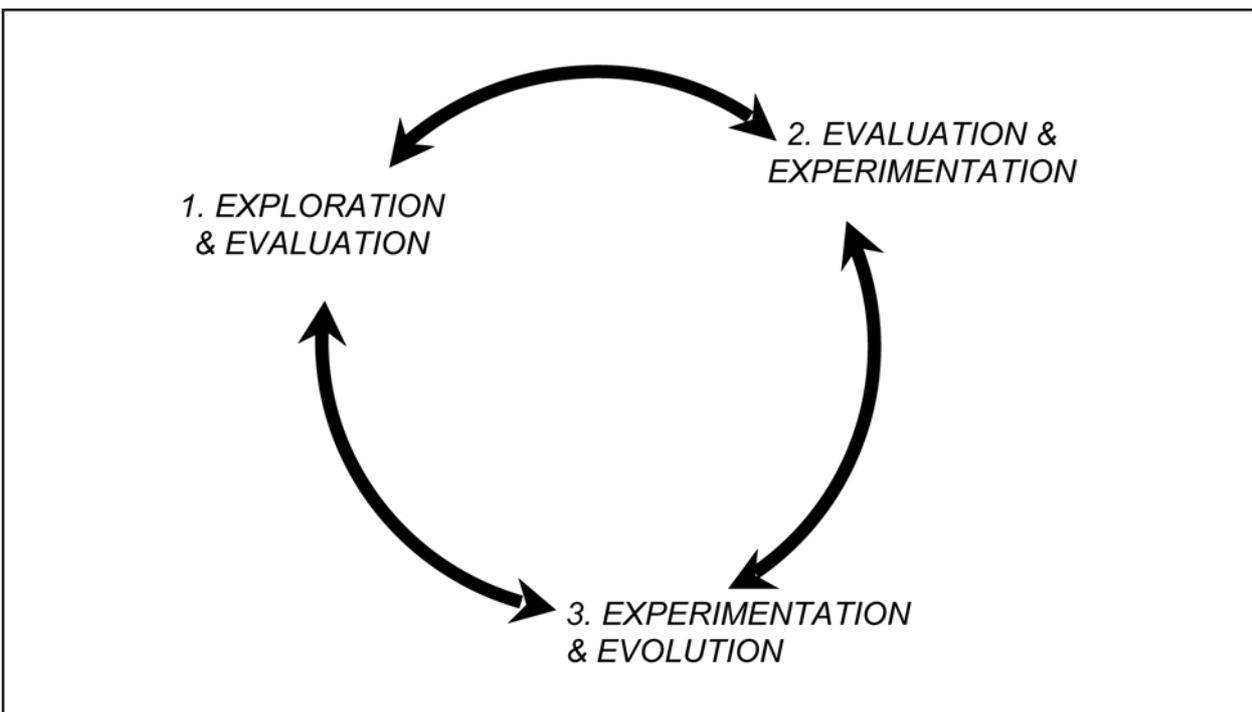

Figure 2. The phases of designerly learning in a Design Museum workshop

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Lights, Graphics Packing & Branding, Eco Design, Fashion Textiles, Phones and 'Mystery Objects'). The aim is to equip learners with key terms and concepts that they can apply to other design pieces, as well as to inform their own creative practice of designing. Learners explore a piece of design through four main 'lenses'. These lenses are formal qualities and style; materials and manufacturing; function; target audience and impact, including issues to do with consumption and socio-environmental concerns. Intensely discursive and collaborative in nature, this phase is as much about the hypothetical and the imaginative response as it is about developing a critical response. Why might certain decisions have been made and not others? It culminates in the learner making an annotated drawing using the key terms and concepts, and summarising their main questions or issues arising from the evaluation, before moving on to the next, overlapping phase of 'Evaluation and Experimentation'.

In 'Evaluation and Experimentation' learners use the critical knowledge developed in the first phase to manipulate materials within an open-ended context. It's not a case of 'design a spice rack/clock/cd holder', but rather, 'what do you want to do with your materials?' (Respondent E) It enables learners to make 'happy mistakes' as they explore the properties of their materials (usually different types of paper, card and wire). It's about some small measure of risk-taking through which experimentation enables

evolution of ideas, continued in the third phase, 'Experimentation and Evolution'. This third phase pivots around the question of how the learner might improve a piece of design. One popular approach is that of the hybrid object in which learners identify and bring together particularly strong aspects of pieces they have critiqued to create a new piece. All workshops culminate in a plenary session in which a selection of learners present and critique their pieces and reflect on their experience. Given time, the workshop then moves to phase 1 again, this time with a new piece of design under consideration, evolved by the learner. The designerly learning behaviours of Figure 3 play out across all of the phases with differing emphases according to the task at hand. There is an intimate relationship between the behaviours encouraged throughout the ideal-type workshop and how designers describe their practice. By seeking to explore and communicate ideas and collaborate on solutions, they focus on the way that designers look at the world, seeking out needs, wants and opportunities for improvement;

"Good design is about looking at everyday things with new eyes and working out how they can be made much better."

(Dyson in Stamm, 2004:3)

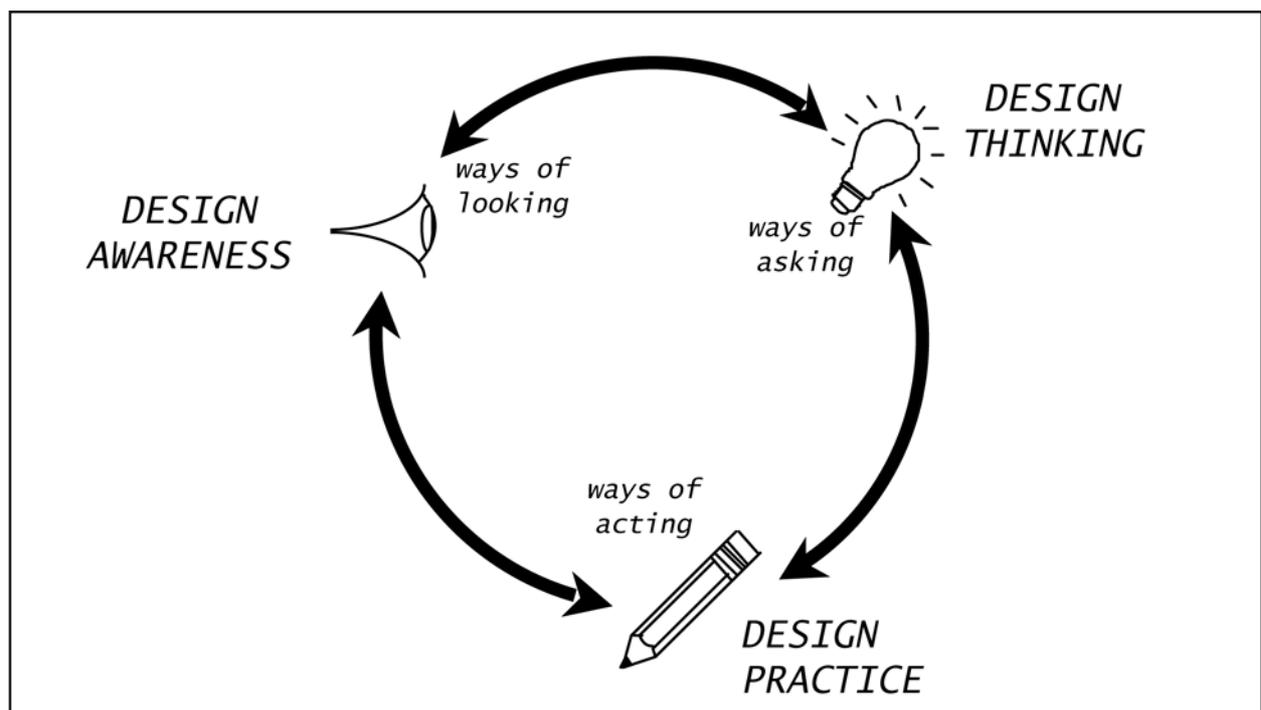They also focus on how they act, using the medium of drawing as their primary design language:

Figure 3. The behaviours of designerly learning in a Design Museum workshop

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"I draw something – even if it's potty – the act of drawing seems to clarify my thoughts."
(Jack Howe in Buchanan & Margolin, 1995: 107)

From the analysis of the way in which learners encounter design within the museum workshop situation, three modes of behaviour can be distilled: looking, thinking and acting. These behaviours are constant whether the focus of a workshop is product analysis or creativity and design, and regardless of the different design disciplines which are being explored. The constant interplay between the practice and development of looking, thinking and acting is a distinguishing feature of the learner's encounter with design. The movement between them is fluid, and is the Design Museum's distinctive 'take' on the design process. In Figure 3, Design Awareness translates as looking with purpose, considering a design piece from a variety of viewpoints (the four 'lenses' stated above in the analysis of the third shared perspectives). Design Thinking translates as the critical and creative approach, exploring the needs, wants and opportunities informing a piece of design and any related socio/political/environmental issues. Design Acting translates into the creative practice of design through making, using the core design languages of drawing and modelling. To varying extents all three of these behaviours will be manifest across the different stages of a workshop.

In sum, 'designerly learning' in the workshop situation can be said to comprise the content, phases and behaviours of learning set out in this paper, within the distinctive environment of the Design Museum. At the localised level of the Design Museum it is therefore possible to argue for a more refined version of the open definition of learning given by the Museums, Libraries and Archives Council. In conclusion reflections are offered on the usefulness of such an in-depth localised understanding, along with a consideration of some of the questions raised by the research.

Conclusion

A note of caution about 'designerly learning': the concept operates at a level of theoretical abstraction, emerging from interview data based on my respondents' reflections on their teaching practices in the workshop situation, rather than through accounts of learners' experiences. The conceptualisation of 'designerly learning' is not intended as a definitive model of the multifarious ways in which learning takes place at the Design Museum. Instead it is a touchstone that elucidates shared perspectives on the content, environment for and organisation of the experience of learning within the workshop programme, affording the workshop programme a degree of theoretical

coherence. In conceptualising learning, it is important to be wary of drawing false dichotomies as in practice the reality tends to be more hybrid and fluid. This research into conceptualising learning at the Design Museum has revealed a more complex situation than simply being able to say 'learning is understood as x and not as y'. The shared perspectives are perpetually in conversation, overlapping and informing each other. Thus the visual conceptualisations of 'designerly learning' in Figures 2 and 3 propose a useful set of understandings that underpin – rather than pin down – how learning is organised within the museum's workshop programme schools.

In focusing on the workshop programme format an embedded relationship has been identified between the subject specific typology of the Design Museum and the experience of 'designerly learning'. The importance of this can be found in the argument that museums are not neutral, generic spaces for learning. At the Design Museum, the workshop programme is not simply a set of activities and experiences that take place under the same roof as the collection and temporary exhibitions, but instead are part of the organisation's identity, woven into the very fabric of its institutional DNA, from its inception. As such, the value of the notion of designerly learning for the museum can be found in the view that;

"…we understand a subject when we can demonstrate that it exists as a real phenomenon which can be differentiated from other phenomenon, when we understand why it deserves treatment in its own right; and, finally, when we can explain why it is as it is."
(Buchanan & Margolin, 1995:xii)

This proposition resonates with the need to refine the broad definition of learning offered by the MLA in relation to activity at the Design Museum if we are to better understand our practice and be able to differentiate it from those educational activities offered in other museums. In proposing the concept of 'designerly learning' in the workshop programme, it might now be said that the Design Museum's team of educators now has its own version of an 'adequate, simplifying paradigm' of learning.

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helen@designmuseum.org