Problem-finding as a research strategy connecting undergraduate learning with staff research in contemporary education institutions

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Abstract

While problem-solving is defined as a research method based on a number of givens in a linear process, problem-finding is an open-ended mode of design, actively engaging participants in a reciprocal discourse. This method of learning by doing is implicit in design education. To examine problem-solving in the context of undergraduate study a collaborative staff–student research project is presented in the form of a case study. By continuing to find 'problems', design educators and students alike are challenged to push the boundaries of the discipline and frame it more centrally as an agent of change in society and culture. In a development of my Ph.D. and HEA Teaching Fellowship the design process is framed as a bridge between academic research and student employability. In this context I suggest that research strategies developed through doctoral study extend and substantiate teaching and learning in design.

Keywords

problem-finding

purposeful discovery

design process

design research

collecting

Introduction

This article concerns how an open-ended research method, described as problem-finding, can be employed as a productive parallel strategy of discovery for staff and students in a studio-based design project.[1] The exploratory mode of this exercise was developed over two complimentary and evolutionary stages in collaboration with a group of level 5 graphic design students from Kingston University. At the beginning of the second year programme I delivered a series of research methodologies workshops on Wednesday mornings. The workshops were optional, and occupied a space in the week usually kept free for self-directed work. During this time I applied the research component of my fractional teaching position to direct student contact in order to test research through practice as a process of thinking through making. The workshops introduced an area of my research to the students, based on ideas of collecting as a material mode of knowledge that had been developed with the aid of my HEA Teaching Fellowship (2011). Collecting also forms the basis of the discover stage of the research process employed in my practice-based Ph.D. The workshops were devised to identify if and how these skills could inform and enhance the development of design research skills at undergraduate level. As this article demonstrates, the academic contexts of the design provide apposite physical and conceptual spaces in which to converge the complimentary concerns of critical design practice with doctoral research.

The first stage (autumn term) formed an open-ended introduction to design research methods through the *collected* subject/object and the second stage (Spring term)

applied these methods to developing visual identities for design disciplines in a *collective* operation. The research and/or outcomes of the staff–student collaboration would in/form part of an HEA Seminar that I had funding to deliver in April 2014. Neither phase of the project was devised as a case study but a fusion of the two emerged, on reflection, as a valuable example of teaching and learning after the series of workshops were completed and the event was presented.

Research through design

Research is framed in this context as providing a deeper understanding of the discipline through material iteration and critical reflection. Yet for the design student, with time efficiency a major consideration, research may be perceived as a means to an end, in terms of weight (number of printouts, Instagram or Pinterest posts) or produced 'for the tutor' (even within a personal project). At its worst, 'primary' research is perceived as the first level of references found from available Internet resources, while 'secondary' research is the work you do next. By contrast, for the design educator, research (with a big 'R') is increasingly quantified in terms of the REF (Research Education Framework), a measuring stick against which an institution or individual is validated and job security/status gained: despite being dependent on uncertain or continuously shifting criteria.

Two interrelated approaches to design research were introduced to the students through the weekly studio-based workshops: *collecting* as an experiential mode of research-in-action and the *collective* as a collaborative discipline-orientated working group. Collecting is defined as a hands-on approach and differentiated from listing –

finite, absolute or a hierarchical ordering of information – and accumulating/hoarding, which lacks system and structure. The only constraint given to the students was that the source of the collection must exclude the Internet, smartphone and similar digital devices. Conventional design mechanism were applied to the documentation and organization of initial discoveries: collected subjects/objects could be photographed, drawn, recorded, cast in plaster, mapped or physically taken (not stolen) and labelled with a brief caption. In this way the collection could be developed as a mode of creative writing (and typography), as a system of mapping (data), as an image (photograph, film) or product.

Yet what value does material collection have as a research method when the student has easy access to the 'world wide web' and the vast (infinite) information contained therein via the laptop or phone? Some 'problems' of basing research on Internet resources include issues of authorship, all images have been identified and posted by someone else. There is little sense of material impact, scale and weight in a space, and an element of chance can be lost in the online search. The creative opportunities of purposeful discovery and chance are highlighted for artists in Lewis Hyde's ([1998] 2005: 131) *Trickster Makes this World: How Disruptive Imagination Creates Culture* thus: 'the agile mind is pleased to find what it was *not* looking for'. He goes on to suggest that the lucky find occupies a liminal in-between space in which the fertile transformation of the happy accident leads to the discovery of new ideas, methods and designed artefacts.

In Jean Baudrillard's (1994: 9) words: 'For the child, collecting represents the most rudimentary way to exercise control over the outer world: by laying things out,

grouping them, handling them'. This does not necessitate that collecting remains a childish activity. Indeed, the social act of swapping can be adapted to analytical discourse in the design studio for undergraduates. Collecting can form a lifelong mode of learning about the world through the observation, analysis and interpretation of designed objects and signs (Edwards et al. 2002) and was framed as an investigative material process in the workshops rather than as a mode of digital bricolage. For Levi-Strauss ([1962] 1972: 35) the mythical images and materials of the 'bricoleur' have *had* a use in a particular context then in a process of removal or reframing they can be *used again* for a different purpose (original emphasis). In this theoretical framework the object's original meaning remains, despite its redeployment in a new context of communication. By contrast, the fluid creative space of social semiotic theory describes how signs can be reconfigured through practice to help analyse meaning and propose alternative approaches to graphic design. In *Multimodal Discourse: The Modes and Media of Contemporary Communication,* Kress and van Leeuwen (2001) argue that, in the *social* semiotic framework, meaning is not pre-destined but can (continuously) be made anew by all sign-makers from children to professional designers. Each sign-maker creates his or her 'own' representational resources as a part of a constant production of visual meaning. Thus, what can be *found* and reconfigured for new uses in new contexts through open-ended exploration is introduced as a valuable alternative to what can be identified and known in a more conventional mode of problem-solving in design for the students.

Graphic design is commonly perceived in terms of problem-solving: a linear and scientific method based on a number of definitive 'givens'. Yet, the social reality of designing is essentially 'undetermined' and 'open', lacking clear definition and

completeness (Buchanan 1992: 16) and is at odds (conceptually) with the linear structure of problem-solving. In this design research project, a problem-*finding* rather than problem-solving approach is employed to capture a spirit of explorative discovery. For Brian Lawson (2005) in *How Designers Think: The Design Process Demystified* this dimension of research has many parallels with the delivery of design education: a method of learning by doing, where students are encouraged to 'find' problems in which the capacity of design can be tested, anticipating future possibilities for the discipline (Lawson 2005: 7). Problem-finding is a particularly valuable mode of research in design education because it embraces the positive uncertainty of a discipline in continuous flux and, in so doing creates greater understanding of the discipline's activities. Problem-finding is developed here as the process of enquiry itself, rather than an outcome of this activity, described in terms of an iterative process leading to innovative outcomes by Noble and Bestley ([2005] 2011: 9). The convergence of diverse and sometimes unlikely connections identified therein, helps reveal unexpected dimensions of practice and more expansive notions of design knowledge.

Conventional design tools are employed in unconventional ways as a mode of research through design or critical design practice. Seago and Dunne (1999: 16) describe how design mechanisms, processes and products can be used as research tools to *embody* research questions: 'by stretching established conventions, whether physical, social, or political, rather than simply affirming them, [design] takes on a radical critical function, a material critical theory'. The tools and technologies employed in designing are constantly being revised in response to new systems of communication and audience needs: this evolution requires continual critical

awareness by designers. For Dunne and Raby (2013: 35) design that asks carefully crafted questions and makes us think, is just as important as design that solves problems or finds answers. In this way problem-finding is framed as an active process of critical discovery through the collected object or idea embodied in design tools or artefacts.

Definitions of design research: Theory in practice

An underlying motivation in this research project was to infuse research design theories in/through practice for the students (in a pedagogic application of my Ph.D.) in the form of workshops, talks and projects. Design's fluidity and pragmatic bias, make it difficult to establish a defined body of graphic design theory or research (Armstrong 2009). As a consequence, perceptions of design tend to be dominated by commercial issues and a functional imperative and defined by its material products: poster, book, billboard, website. While not wanting to define design's activities solely through established academic sources, I sought to reconfigure design *as* research, critically contextualizing the discipline in current design debate (for instance in the work/writing of Andrew Blauvelt [2006] and Dunne and Raby [2013]).

From a theoretical perspective Frayling (1993: 5) identifies three classifications of design research: research *into* design refers to broad explorations of design praxis itself as the object of study in the context of design's civic, cultural, material and commercial roles. This may lead to new methods, artefacts and paradigms of practice situated both within and beyond the traditions of the discipline in a more speculative operation. Research *for* design is described as an act of gathering and evaluating

historical and/or critical reference from visual and material sources with the purpose of thinking about the discipline. Research *through* design primarily concerns customizing materials and technology for new uses: a form of action research in which the research diary (or poster, as we shall see later in this article) itself embodies knowledge as a process of investigation. Research *through* designing primarily concerns customizing visual mechanisms for new uses: a form of action research in which design tools (photography, drawing, typography) and vehicles (book, poster, website) embody knowledge as a process of investigation. The collected object/theme, critically analysed and then transformed through design into a message, merges aspects of all three classifications. The weighting of Frayling's interrelated areas could be dependent on the student's research interests, personal history, peer group, current events and evolving development of the collection.

For Schön (1992), the fluid status of design thinking is contextualized through studio-based reflection and the deployment of materials appropriate to each design task: documentation and reflection are significant components of this method and its evaluation. He argues that it is not the aim of the designer to first fix the problem as a result of objective analysis and then to search for a solution in a linear rational approach (problem-solving). Instead the designer develops and refines both the 'problem space' and 'solution space' of a design project as a consequence of the design process. In this context the tools and techniques of graphic design form part of its theoretical basis, deployed to 'test' ideas and encapsulate new knowledge. In Schön's (1983: 280) words 'doing and thinking are complimentary. Doing extends thinking in the tests, moves and probes of experimental action, and reflection feeds on

doing and its results. Each feeds the other, and each sets boundaries for the other'. The problem is thus found or defined as a part of the design process.

In practical terms the workshops were developed in response to a number of concerns relating to design research that students had identified over recent years: some unspoken, some more explicitly articulated:

1. What is research (for)?
2. Where can research be found?
3. How much do I need to produce?
4. What role does research play in my project/work?

Undergraduate students bring attitudes and approaches to producing research (from UK schools), which are often reductive, biased towards the written word and lacking the discover-play-challenge-test methods of degree level study in the arts. The academic transition from set questions and answers in a formal system of quantifying achievement to a far more ambiguous and critical mode of learning can be difficult for many students. The advantage of collecting, for those unfamiliar with the design process at HE level study, is that it requires no specialist knowledge or kit and can form an introduction to research methods for all stages of teaching and learning[2] in the discipline.

Background to the case study and research methods workshops

My HEA Teaching Fellowship (awarded 2011) focused on collecting the letter X as a method of revealing evidence of design ambiguity in contemporary cultural discourse. The collection represents a body of material through which the nuances, uniformity, functionality, symbolism, manipulation and meaning of everyday design products and messages is identified for closer analysis. Collecting thus helps unfold meaning and expose new possibilities in relation to observed and documented evidence of a subject/object in context. Documentation inherently involves editing: choice, decision-making and framing (visually and conceptually) are core skills in design and this project, needed to establish value judgements and hierarchies of information. In this way, the student's collection acts as a reflexive catalyst for 'a discourse directed toward oneself' (Baudrillard 1994: 22): an opportunity to reflect on one's own working methods and perception of the role design plays in everyday culture and commerce.

Aims and objectives / Stage 1

1. To broaden the scope of research methods and resources in relation to a personal subject of interest
2. To challenge the written (lists) bias of early research
3. To increase perceptual awareness of visual information in the everyday
4. To reconfigure research as a process of discovery rather than on object
5. To discover new insights into design practice as a consequence of the process

The subject of the collection could be anything without inherent value (not designed products such as flyers), that is easily accessible en masse, that has possibilities of transformation, is not vast (such as time) or too subjective (dreams). The subject or

theme of each student's collection must be interesting enough to sustain intellectual and creative curiosity in the subject over a number of weeks. Despite not being a marked component of the course, or having clearly defined outcomes, the workshops proved surprisingly popular: over half the cohort of 80 regularly attended. One asset of problem-finding that I hope to impart to the students was the open-ended value of this research methodology, leading to unknown and maybe even ambiguous conclusions. It was important for students to gain a sense of conceptual fluidity in this context, reflecting the ambiguity of visual signs in the cultural production, tested through current design media and methods: to create work based, not on what *is*, but what *might be*.

Figure 1: Beth Heald (2014), initial drawings, maps and photographs.

No outcome could be deemed incorrect because the process rather than the product of designing was the initial focus of the workshops. However, structure is required even in this context to establish conceptual and creative boundaries for the project and manage the development of each student's research. Structure was introduced in two ways in these workshops; first, as a form of critical reflection leading to creative responses and, second, as a design process. A brief typology of analytical criteria was introduced at the beginning to help structure the research and development of the collection comprising *subject* (theme), *form*, *context*, *concept* (meaning) and *process*. Peer review and reflective analysis during studio pin-up sessions helped the evolution of skills particular to each student's personal collection and the media used in its development. In one example Beth Heald (Figure 1) developed a collection of documented cracks in the pavement. These were closely analysed and transformed,

through mapping and applying a mathematical structure, from a chaotic system of material flaws into a logical system full of possible meanings. Form and concept, function and context are considered in synthesis here: how these relationships might impact on meaning in each student's archive was revealed initially through peer group interviews. As a reflective starting point the students found this studio-based discussion more productive than considering these issues independently.

The Design Council's (2007) 'Double Diamond' was introduced to the students as a structural research model that can be adapted to diverse design problems/tasks, whether for speculative propositions, for industry or in educational contexts. Its four stages – discover, define, develop, deliver are iterative, cyclic and non-linear in nature, enabling (or requiring) the designer to revisit and reconfigure their ideas, based on new perspectives and information, as they are discovered. All structures, models and theoretical references were visualized in the workshops on paper while I talked through the process, thus animating the relationship between theory and research practice. The maps, diagrams and theoretical quotes were left pinned up in the studio for student documentation and future reference. Theory was framed here as a way of thinking about communication and representation in more strategic ways, considering the contemporary social, political and cultural conditions of design. In the context of social semiotics, designers are framed as part of a multimodal discourse in which meaning evolves, and is reconfigured through familiar signs used in unfamiliar ways, new social networks and technologies (Kress and van Leeuwen 2001: 120–21).

Designers tend to collect the vernacular or disposable object, such as waste transformed into something exceptional: raw material creatively developed through a

process of collecting and classifying. Subjects the students chose included; fluorescent lights (pattern and timing), train tickets (narrative journeys), paper folds, masking tape, circled things, colour codes, lost words. Through play, experimentation, and critical reflection each collection transformed in terms of form, purpose, media and meaning. Students worked at different speeds through a range of diverse media: the material transformation from overlooked object to new insight demonstrated how design could be used as a practice-based research strategy in a mode of problem-finding for the students. In order to reframe the research process as an outcome, each student applied the stages of their own process to a designed poster series as a reflective research document (Figure 2). In this format, each research journey could be illustrated clearly for the whole group to compare and discuss demonstrating the inherent variety and richness of possibilities derived from a simple collection developed through an open-ended adaptation of the design process.

Figure 2: Beth Heald (2014), Research process posters as reflective documents.

Based on the students' engagement in this process of problem-finding I presented a proposal to the group at the beginning of the Spring term. For Stage 2 I asked if the students would be interested in forming a small design team to work collaboratively with me on the subject of collective working identities. As an extension of research into the collected object, this stage focused on collective nouns for occupations and in particular design disciplines. This development of the workshops applied problem-finding to the development of visual identities for a live event. The timescale and focus for the project was defined by the event: an HEA seminar on 4 April 2014 I had been awarded funding to deliver. By meeting one day a week strategic stages of

development could be deployed as points for creative and critical reflection with the students.

Stage 2: Collective identities for design disciplines

A group of ravens is known as a 'murder', you can encounter a 'business' of ferrets and a 'dazzle' of zebras, but what about a group of designers, a collective of illustrators or gang of film-makers? Beyond the world of birds and beasts a diverse range of professions and occupations have been assigned culturally agreed collective nouns: a panel of experts, a murmur of nuns, a den of thieves, a flock of tourists and so on. Yet, despite commonly working in teams, creative professionals lack their own agreed upon collective nouns. However, the richness and flexibility of the English language represents an opportunity to continuously create new terms.

Although in professional practice differences in the multi-dimensional field of design are ambiguous or negligible, at undergraduate level for various reasons,[3] students understand their own subject of study in discipline-defined terms. Identity is reinforced by *difference* here: graphic design *not* illustration: product design *not* sculpture: fashion design *not* textiles: photography *not* film-making. Rather than increasing distance I wanted to explore how forming collective identities could help forge new understanding and student collaborations across courses/disciplines. I also sought to increase the students' sense of agency through collective belonging and the broad scope of possibilities available through the transdisciplinary intellectual and practical spaces at university.

In my role as project manager for Stage 2 I sought, on the one hand, to productively disrupt the constraints of contemporary teaching programmes, timetabling and time-consuming paperwork, and on the other to expose the real-world uncertainties of live work for the students. From my perspective these concerns were framed as problem-finding in two ways: would the students be prepared to commit to a project, which may not be marked and would the inherent complexities of the project result in resolved visual forms? For the students' perspective, would it be possible to name disciplines as collective identities and formulate visual marks to represent them? The aims and objectives for Stage 2 were roughly as follows:

1. Devise new collective nouns for art and design disciplines
2. Develop new visual symbols to embody these collective names
3. Develop a critical awareness of visual signs in a semiotic framework
4. Test the capacity of abstract marks to embody group identity and belonging
5. Integrate this process and/or its outcomes into an HEA Seminar
6. Implement problem-finding as a mode of productive uncertainty

Figure 3: Notational drawing and concept development in the studio

In a continuation of Stage 1's research and development conventional design tools were tested through the processes of design to guide progress and arrive at workable names and visual identities. Notational drawing and writing was employed to help articulate early ideas in a form that could be shared with those for whom the new collective nouns were being created (see student comments, below). Schön (1992: 8)

identifies sketching as significant, if not essential, to design thinking, facilitating changes of direction and content as external factors alter interpretations of the task (design problem). In addition, continuous discussion and thinking through making in the studio helped formulate what we were trying to say through design. In this way we defined the project's scope and form through the process of designing. Some of the key resources and tools included:

• a studio base // visual pin-up and discussion
• sketching and notational drawing
• digital tools // laptops with appropriate software
• cameras for documenting the process
• semiotic analysis of signs and symbols
• international production resources such as print-making

A range of abstract graphic icons were sourced as starting points for development of collective identities including meteorological symbols, hobo marks, gestural signs and punctuation marks. Drawn by hand initially and then refined in Illustrator the signs and names were developed in synthesis: both written and visual modes of the collective identity were continuously tested against the particular discipline audience. The main student team comprised of a group developing their research methods posters to show at the HEA Seminar, Xanthe Simmonds who helped put a slide show together for the event and three students working on the identities: Hannah Lee, Noni Braithwaite and Mary Graham. Hannah took on the task of devising the symbols and names and designing the badges.

> I mainly took on this job because I enjoyed speaking to other people about the symbols and getting feedback. It was hugely important to speak to other students about their discipline, quite often we would come up with a name and a symbol and show it to someone from that discipline and they would explain that it really did not represent their class, so we would go back and rework it until each discipline was happy.

The modes of representation we chose through discussion included popular graphic devices such as badges (Figure 3) and T-shirts (Figure 4) all drawing on the same core visual elements as a assign-system developed for guiding visiting participants on the day. As the project developed into a substantial body of well-crafted design work, the potential for its application in the live event increased. For Noni, 'it was a fast paced rigorous process and I enjoyed the "cut throat" attitude we all adopted creating the identity. It was interesting to see how we could agree on the imagery and the name of the collective nouns using three different working minds'.

Figure 3: Badge designs by Braithwaite, Lee and Graham; photos, Ezzidin Alwan (2014).

The relationship between collective noun, the typeface employed and abstract symbol (Figure 3) was developed in an iterative process in the studio stimulated by sustained discussion. Noni: 'I think the space we used in the "Glasshouse" allowed us to get down as much of our research in front of us as we could which overall aided a smoother and clearer process'. The dynamic simplicity of several badges were extended and fused into more evocative than functional designs at this point. As these

visual devices developed, a brand identity emerged connecting the early workshops of Stage 1 with the project of Stage 2. The graphic language created by the students was distinct but flexible and so could be extended to operate as very effective signage on the day of the event (Figure 4), staged at Kingston University. This visual cohesion throughout the day applied to the students who acted as helpers (Figure 4) and was commented on as an unexpected attribute on the day by participants. In this way the research methodology introduced at the beginning of the academic year, had evolved into a brand identity: form and concept unified as the result of problem-finding.

Figure 4: T-shirt design, signage and the design team, from left; (project leader and tutor) Cathy Gale; (students) Mary Graham, Hannah Lee, Noni Braithwaite.

Summary and conclusions

For Stephen Heller (2006), as capitalism sets design's parameters, it is hard to break meaningful ground in the discipline while simultaneously serving a (corporate) client's needs and wants. In the college studio, risk, play and ambiguity form a significant role in pushing the boundaries of the discipline. Learning by doing in this space provides an interface between educator, student group, and the design discipline in a mode of reflexive discourse. The workshops and project outlined in this article were developed in a spirit of focused exploration, which followed the Double Diamond's (Design Council 2007) four phases of design – discover, define, develop, deliver – in an organic process. By the latter stages of this exercise it was clear that the project had attained academic and personal value to the students, so an appropriate module was identified in which this work could sit. In addition, funding was found by

the college to pay for the students' role as assistants on the day: this help consisted of acting as guides at the HEA Seminar and support for on-the-spot definition, design and production of new discipline badges (Figure 5). The students were then able to follow a project through from its earliest stages of research, through development, production and dissemination. Mary: 'I really enjoyed working as a team and then being involved in the actual event. Being with it from start to finish was a great experience'.

The interest the students took in the learning process of the workshops I devised led to the possibility of developing a collective identity for a working team. This staff–student team then formed a cohesive branding identity for a ticketed event based on collecting as a research method and designers as a collective new noun. A mature and focused approach by the students did not prevent the process being flexible in development and fun in spirit. They took ownership of the project and developed the components into a cohesive professional outcome. Mary:

> It was an optional brief so I didn't feel as much pressure so was actually able to relax more with it and enjoy the process, which I believe lead to better outcomes. It was nice being given a sense of responsibility and to see our creations go live, with the people at the event engaging with them.

The energy, collaborative nature of the project and playful/exploratory process employed was entirely in step with current inter-disciplinary thinking in design practice. Students infused the social, cultural and creative implications of their designs for different disciplines in a fluid process, bridging the gap between studio

projects and live jobs. As such, the problem-finding research approach resulted in positive teaching and learning outcomes and applicable written and visual identities. Noni: ‘The process we adopted very much reflected and helped how we were developing other research for our course projects’. The problem-finding approach required students to interrogate how visual meaning is formed and interpreted through iteration and open discourse. Mary: ‘I learnt so so much from this exercise. Generating symbols, creating visual identities and the copy for the identity. It prepared me greatly for 3rd year and the working world’.

The project relied on a number of factors:

• student interest in (initially) unmarked work
• a regular small studio base in which the team could work and material could be left pinned up
• staff teaching time given in addition to contracted hours
• a flexible timetable
• a small group of students
• accessible internal print resources

In the multifaceted and critical context of design, research is an essential component of a student’s educational development in most institutions and is infused into the curriculum in the form of project briefs, lectures, seminars and studio-based discussions. This may be extended to include empirical research such as studio visits, galleries, museums and interviews depending on the design problem. By seeing research not only as a means to an end, but as an end in its own right, problem-finding

was employed as a critical mode of pushing the boundaries of design practice and is an essential component of the discipline today. As a case study, this article has demonstrated how collaborative staff–student projects can integrate theory and practice, research and employability. As a teaching and learning model this project gave agency to the students through the rigour and versatility of the design process. The close relationship that was built between staff and student through both stages of the project was an essential element of trust in a working process. Both groups engaged in problem-finding as a parallel research method: for the students, the ability to take the project from beginning to end, making all printed outcomes 'in-house' contributed to their enjoyment and productive ownership. With increasing numbers and decreasing funding this type of collaborative research is increasingly under threat and ever more valuable to the discipline's relevance to society, culture, politics and economics.

Figure 5: Hannah Lee and Noni Braithwaite creating new identities, names and making badges for participants at the HEA Seminar.

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Notes

[1] Project, problem and task are largely interchangeable terms in design: project connotes something large scale (time and conceptual scope), while a problem is often a particular issue tackled within a larger project and task suggests an even more focused design.

[2] I have taught versions of this brief at foundation, degree and masters level to art and design students.

[3] Institutional factors, such as levelling out funding, student numbers, technological shift, (pop) cultural perceptions of design connected to industry, academic status, etc.