

BACK TO BASICS: USING ESQUISSES TO DEVELOP CORE DESIGN SKILLS

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ABSTRACT

Design education is increasingly complex. A proliferation of new and emerging design agendas combined with broader career pathways has resulted in curricula that is at maximum capacity as it attempts to develop knowledge, skills and competency across a broad range of subject areas. In seeking to address constantly evolving design practice, broad base curriculum can either lack of depth or neglect the core skills that underpin the profession. It is apparent in recent years that design students whilst knowledgeable and capable as *design thinkers*, are often unsupported in the development of the fundamental skills required for design ideation and communication.

This paper describes curriculum initiatives aimed at re-establishing core design skills at the beginning of the design learning journey, in direct response to industry expectations. An observed lack of competency in the core areas of design communication (sketching, rendering and storyboarding) and creativity and ideation, resulted in revision to the level 1 curriculum at Brunel University London to facilitate student learning and to emphasis the importance of core design skills. A term-long program of weekly 'esquisses' was introduced to support the existing project-based curriculum. Resultantly, students now acquire skills through a skills development program, rather than indiscriminately (if at all) during design projects. The twelve exercises are a structured learning platform for skills acquisition that focus on development of design communication and ideation skills, supported by tutor demonstrations.

Keywords: Design education, design skills, student learning experience.

1 BACKGROUND

The first year design curricula at Brunel whilst technically rigorous, historically had not placed significant emphasis on front-end creative skills, such as sketching. Consequently whilst graduates were technically competent, it was apparent that lack of drawing acumen was limiting their creative potential, especially in the ideation stages of new product development. Yet is apparent from graduate pathways that many graduates are employed in non-manufacturing industries where creativity and design communication skills are more valued than technical resolution or design for manufacture.

Without compromising the technical foundation (and traditional strength) of the undergraduate programmes, it was apparent that curriculum innovation was required to strengthen core design skills such as sketching, design communication and ideation skills to better prepare graduates for industry.

2 INTRODUCTION

Drawing and ideation acumen is essential in the product design industry. Drawing is considered by designers as a core skill; one that is highly efficient and free of the constraints imposed by sequential and logic-based CAD software.

It is evident that lack of ability to use drawing for creative exploration, reflection or communication can have a detrimental impact on creative output, constraining innovation and limiting the efficiency of the design process. An educational focus on design agendas and digital technologies (whilst essential) has de-emphasized the value of core design skills to students, limiting their desire to acquire what are seen as *traditional* design skills. However, without the ability to externalise the mental imagery through drawing and sketch modelling, students are constrained in cognitive exploration and reflective practice, limiting creativity in the design process.

A deficiency in core design skills adds a significant impediment to successful product ideation and

design development; impacting on not only on student confidence, but also academic performance and future graduate employment potential.

This curriculum initiative aims to address industry concerns regarding graduate attributes through a structured level 1 program, and is proving successful in *fast-tracking* the development of core design skills early in the students' learning journey.

3 THE IMPORTANCE OF SKETCHING IN THE CREATIVE PROCESS

In an environment of increasingly capable digital design tools, it is natural that a culture of digital reliance and a de-emphasising of traditional skills has occurred. Digital visualization offers students the ability to produce high quality visual representations of design intent with multiple enhancements and the benefits of the 'undo' function. The author does not seek to undermine the impact of these technologies on design practice, but rather to highlight the link between sketching and creativity. In fact, the author has observed that quick freehand techniques often bolster skills and the resultant outcome when using digital tools.

Sketching allows abstraction of concept development; facilitating the creative process through quick and immediate external representation of mental imagery and design ideation. Free of the sequential and logic-based methodology imposed by CAD software, sketching allows multiple and simultaneous iterations to occur promptly. This externalization of thoughts and the subsequent interaction between designers and their sketches (and reinterpretation of ideation), was identified by Purcell and Gero [1] as essential to creativity. Sketching affords a higher level of abstraction and reflection, facilitating creativity and innovation [2].

Unless design students develop competency in sketching they may fail to visualise their thoughts sufficiently to engage in what Schön and Wiggins [3] called "the reflective conversation with the situation" that unearths the unintended consequences that inspire the design exploratory process.

Verstijnen and Hennessey [4] who compared industrial design students in their Sketching and Creative Discovery study noted that "the skilled sketchers' benefited from the externalization of mental imagery," whilst Goel found that expert sketchers more easily translate thought to design intent, unencumbered by the need for excessive concentration on drawing technique. This fluidity frees the mind for abstract exploration and reflection, enabling "the creative shift to new alternatives." [5]

Ullman et.al [6] noted the importance of being able to represent design concepts graphically," surmising that a successful design process can be *limited* by inability to use graphic representation as a cognitive extension. "This implies the need for training...in the ability to represent concepts that are more abstract and better represented as sketches." [6]

Therefore, whilst the contribution of digital design tools to product design and development is acknowledged, there appears to be a persuasive argument to go 'back to basics' and teach drawing to enhance creativity and facilitate design communication.

4 PRODUCT DESIGN SKETCHING

Sketching is essential to the creative design process as it enables reflective criticism (seeing that), analogical reasoning and reinterpretation (seeing as) [7].

Industry employers expect designers to be proficient at creative exploration, critical reflection and articulate communicators of design intent. The contribution of sketching in product design is not limited to creative ideation, but is an efficient and effective tool to be used at all stages throughout the product design process, allowing designers to figuratively express abstract elements, quickly resolve form, function and technical details, and communicate user-product interaction and complex assembly.

Creative design sketching can be defined as a series of interconnected roles that aid value *throughout* the product design process, as follows:

- explorative or investigative drawing (ideation)
- functional or technical drawing (resolution)
- explanatory or instructional drawing (communication)
- aesthetic styling (form giving)
- persuasive drawing (hero or sell image)

These are all core skills for product designers, but not always explicitly taught. Yet without these skills, design graduates will be overly dependent on digital visualization tools and may lack the ability to explore, abstract and reflect in a time efficient, unencumbered and creative manner.

5 A NEW CURRICULUM INITIATIVE

At Brunel, the 40cp level one module Design Process 1, aims to introduce the knowledge and skills required in the new product development process, and was identified as the most appropriate module to introduce a new *core skills* curriculum initiative. The term 1 module curriculum previously contained three design projects, through which core design skills were not explicitly taught, but acquired (in part) through project work. However, without specific training, students did not appreciate the value of sketching and creative ideation processes and consequently failed to fully explore design possibilities and effectively communicate design intent (without resorting to CAD).

The esquisse initiative develops core design skills through a series of in-class exercises, which aim to support students to gain competence in product design communication, creativity and ideation, sketch (foam) modelling, and an understanding of inclusive design through the use of empathy tools. The systematic approach provides students with a framework for the design process that is of value when they progress to the term 2 design projects.

5.1 Using esquisses as a learning method

Esquisses are often defined as a first usually rough sketch, or a quick exercise to outline the general features of a project. In this context, the weekly esquisses were a series of in-class exercises, which are attempted in class with tutor guidance and later developed and improved in the students' free time. A series of short carefully defined exercises, supported by lecturer demonstrations and instant feedback has proved an ideal way to intensify student and lecturer focus on skills development, which can be lost within critique on design development and project outcome. In addition, the need to generate sketching and ideation on demand, has resulted in a higher level of student engagement during tutorials, and facilitated peer-assisted learning.

5.2 Delivery

Each tutorial starts with the introduction of the new esquisse followed by a lecturer demonstration using the document camera with drawing technique projected onto three large screens. A team of tutors (including industry professionals have provided live demonstrations of quick perspective techniques, marker application and storyboarding, which has been captured as video or stills to support student learning.

The students grouped into tables of 6-8, then spend two hours attempting to replicate technique, with support from lecturers and classmates. It is at this stage that peer-assisted learning happens without prompting, as students discuss and compare notes on their attempts. It is worth noting that lecturers have observed a tendency for skilled students to form groups with peers at a similar competency level, and for a competitive spirit to drive excellence within that cohort. In less skilled groups, peers have supporting and encouraging; this has been integral to confidence building and skills acquisition.

It has also been noted that the use of in-class 'live' demonstrations student has increased student respect for lecturers. Students respond more strongly to the teaching staff who possess industry level design skills and who have proven themselves capable of using the techniques expected of students.

5.3 A systematic learning process

The sequential esquisse structure allows for progressive development of skills in a supporting environment where the learning pace is carefully structured and skills developed systematically. As many students commence design studies with only rudimentary drawing skills, it is important that each esquisse builds on skills gained in previous esquisses, and that students are able to feel supported until they achieve the core skills and gain confidence.

Initial esquisses develop basic techniques in perspective sketching and basic geometrical construction techniques, though cube construction and the drawing of cylinders, cones, pyramids and hemispheres within the cube. Students then move onto form development through a process of breaking complex forms into simple geometrics, constructing basic forms within perspective cubes, and then using addition/subtraction and blending techniques to achieve the required form (see Figure 1). Learning to deconstruct a complex form into basic geometric shapes helps significantly with form visualization during styling. This method has helped students accurately represent complex 3-dimensional forms, and has proven a valuable approach to form-giving in later ideation esquisses.

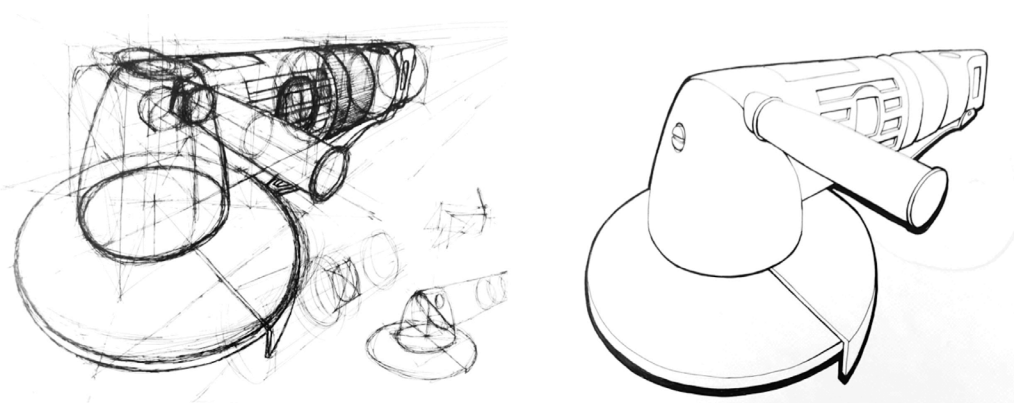


Figure 1. Using basic geometrics for form development

Once the basic drawing techniques have been addressed, the program then moves into different aspects of design communication including explanatory or instructional drawing through storyboarding (see Figure 2), investigative and explorative drawing (ideation), technical drawing through product teardown and exploded perspectives (Figure 3), and persuasive drawing using marker rendering to represent form, material and finish.



Figure 2. Explanatory drawing – storyboarding

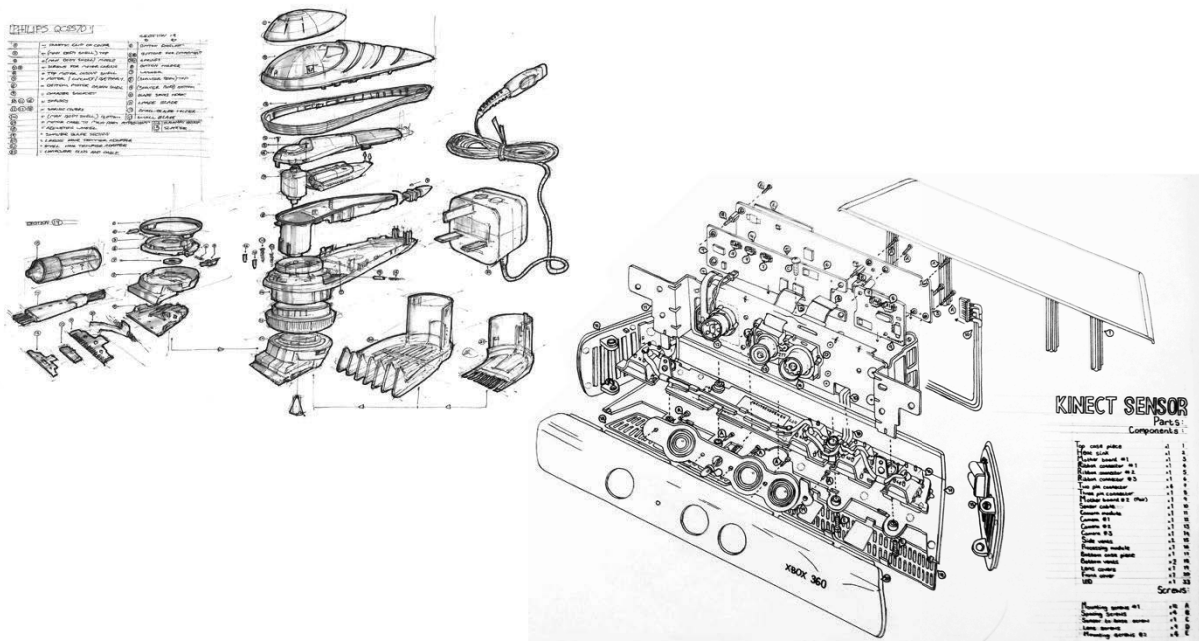


Figure 3. Examples of explanatory technical drawing – freehand exploded assemblies

The drawing esquisses are followed by sketch modelling techniques using blue foam, which enables quick 3D representation, enhanced form giving and design critique and self evaluation. In the later part of the term, students combine all of these skills to ideate a handle design, which is then modelled and evaluated for suitability for an elderly user using empathy tools to simulate osteoarthritis (Figure 4). The critical analysis and reflective process in this esquisse encourages students to constantly challenge their own designs and this is done initially within a small group before completing individually. The product is then redesigned and remodelled.

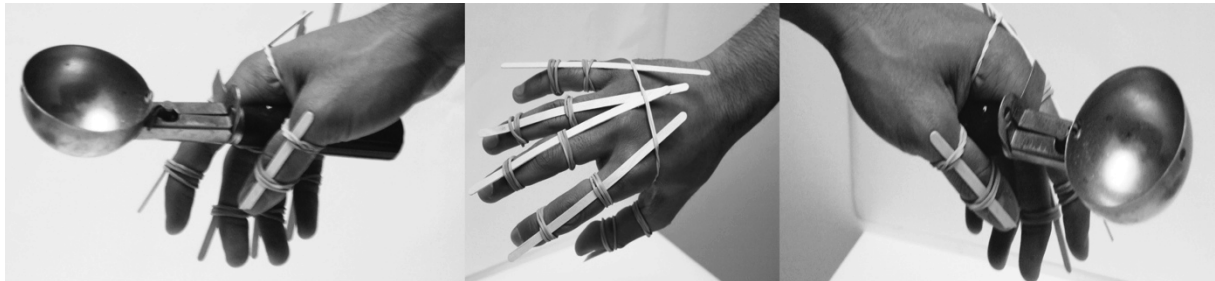


Figure 4. Using hand made empathy tools to evaluate a handle design

The term concludes with an esquisse where students are expected to respond to a given scenario (e.g. addressing water supply in a developing nation) and communicate their design solution using ideation sketching, storyboarding (to communicate user-product interaction), exploded perspectives (to show technical detail) and persuasive 'hero' renderings.

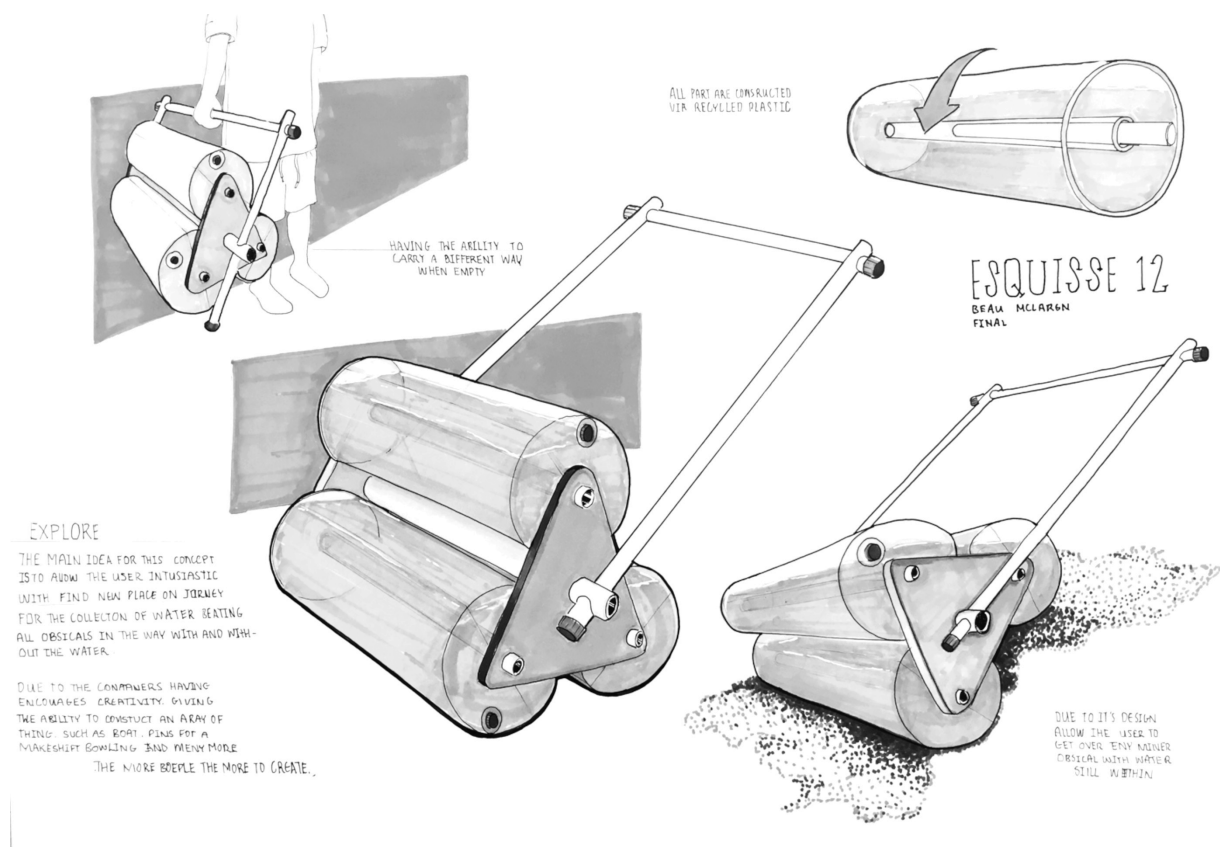


Figure 5. Using newly acquired design skills to communicate a design proposal

5.4 Feedback and assessment

Formative feedback occurs weekly. Tutorials are structured so that work is reviewed in every session, with remedial demonstrations provided as necessary. Working with small groups of students, tutors provide detailed feedback and encourage all group members to engage in the review process. This has the benefit of reducing feedback duplication, and provokes peer-assisted learning.

Summative assessment occurs at the end of each term. The students have the opportunity to improve and revise earlier submissions (based on the weekly feedback) and then submit the esquisse outcomes for assessment in a portfolio early in Term 2. The portfolios are marked and moderated and both written and one-on-one verbal feedback with suggestions for improvement is provided to students during term 2. Students then have a further opportunity to revise their work before all module assignments are submitted in digital portfolio format at the end of the academic year.

Unfortunately, this rather comprehensive submission and assessment process, creates a significant assessment burden for tutors. However, in response to student feedback, it is deemed essential to provide a significantly high level of support during the skills acquisition process.

6 REFLECTIONS / IMPACT

Whilst highly successful in accelerating development of core design skills, the weekly esquisse are somewhat relentless and have resulted in some workload and logistical concerns.

The requirement for student to deliver esquisse submissions every week of term placed a significant load on their time. Whilst the module is a double credit point core module, and as such should have an out-of-class workload of at least 9 hours, there is no way of determining time input required as students enter the course with differing skills and abilities. Consequently, the students with less developed skills, have a more significant workload early in the term as they acquire core skills.

The need to deliver weekly formative feedback and suggestions for improvement (often involving quick technique demonstration), has placed significant pressure on the teaching staff, especially with large student cohorts. Teaching staff can struggle with the twin demands of providing feedback on the previous week's work, whilst also giving guidance regarding the current week's esquisse.

7 CONCLUSION / DISCUSSION

Whilst some may question the notion of postponing project-based learning until the core skills have been expressly taught, there is no doubt that at Brunel this approach has been beneficial to student learning. The term 2 design projects provide evidence that skills acquisition has been accelerated and that students have the tools to realize more successful and innovative solutions than previously.

Dedicating a whole term to basic skills acquisition has had two key benefits; one it has forced the students' to work on skills development (as it was explicitly assessed), and secondly it has resulted in an attitudinal shift amongst both staff and students. Students whose level 1 study preceded this curriculum initiative, are now demanding remedial workshops in drawing and this has directed changes to the level 2 curriculum to strengthen design communication skills.

Whilst it is too early to measure whether this curriculum initiative has improved graduate attributes, the first student cohort to have experienced this curriculum will be on industry placement next year, and tutors look forward to feedback from long-term placement employers.

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