Getting Lost in Design Drawing with the Satnav Natives

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ABSTRACT

In the context of the Attention Economy, this essay discusses an immersed digital learner. It posits the metaphor of the Design Satnav as the way these students conceive the design process. This Satnav is understood as the antithesis of the traditional conception of design pedagogy - as these learners metaphorically rely on a Satnav to practise design, identifying an explicit end-point and operating a set of instructions to execute a project. For Foundation students, an attitudinal approach is presented that creates a shared performative space for drawing, supporting learners in finding the confidence to get lost in the design process.

Introduction

On a sketching trip, the drawing tutor's friendly challenge to their students: '*Just this* [brandishing a pencil] *for all that* [gesturing towards the world at large]', pinpoints the designer's predicament.[1] That is, through creative acts of design, how to shape use and meaning from within their rich and contradictory experience; and how to find the self-resilience to do this without anticipating the outcome or a clear idea of how to get there. This essay discusses the authors' belief that this predicament is becoming increasingly difficult for the contemporary learner of design to confront; and argues that this reluctance to engage in this central challenge for design is because of the students' immersion in digital media, which diminishes their ability to manage an overabundant supply of information and encourages their reliance on short-cuts and pre-formed solutions to design problems.[2]

The authors collaborated on a Foundation Design Communication course that works with new learners of design on the development of analogue and digital skills to support their future design practice. Supplemented by workshops in digital media, the major activity in this course is a weekly hand-drawing class with a teaching trajectory developed over 7 years of empirical and reflexive practice. This drawing course runs across two semesters, beginning with observational drawing and concluding with drawing as a mode of design thinking. This weekly class has a performative aspect, providing a space for immediate and unmediated creative activity, which, together with assigned tasks, aims to support the students in developing confidence to find their own way through design problems.
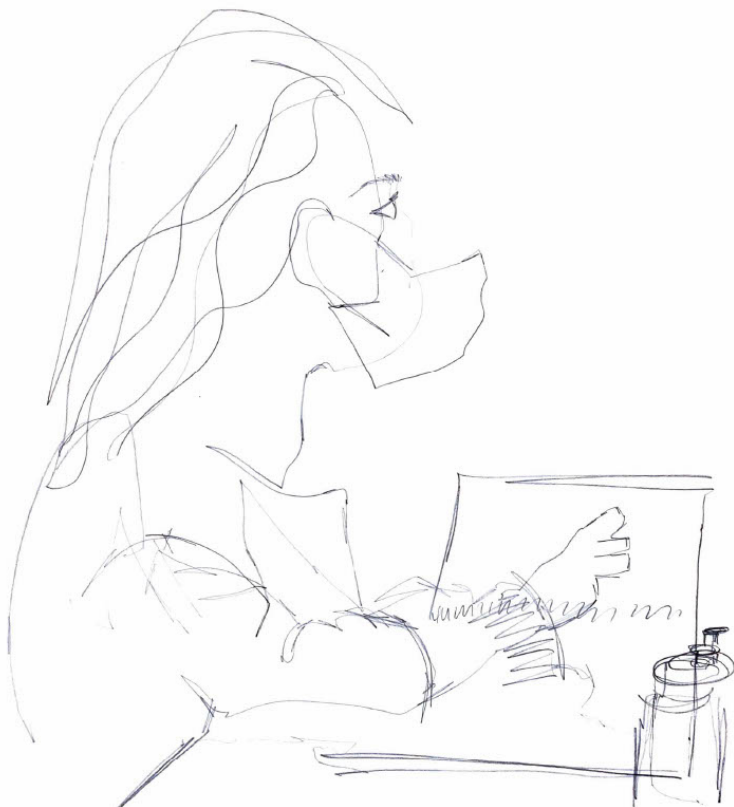

Figure 1:
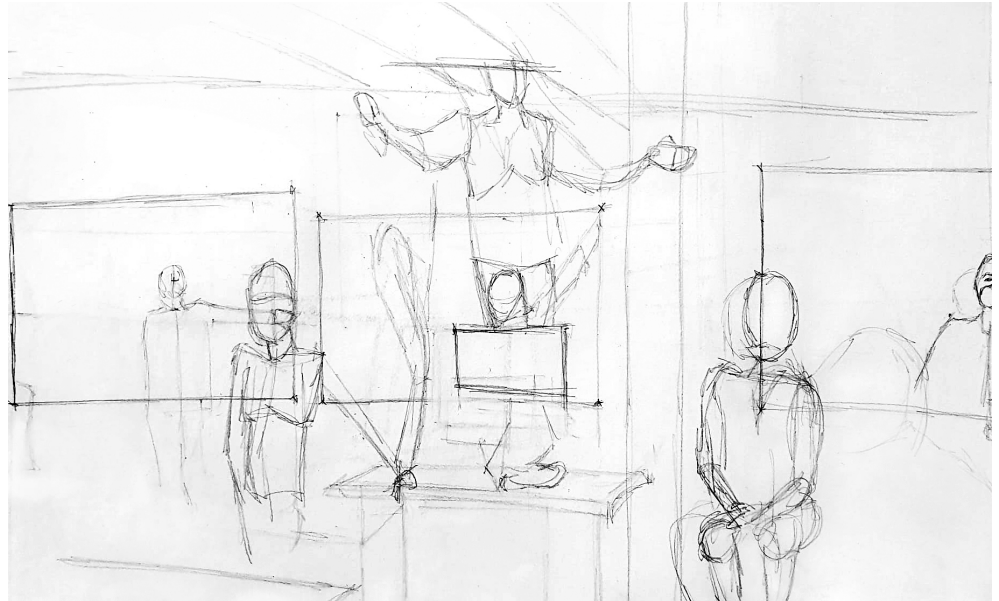Eve Without Looking (Georgia Wigmore 2020).

Figure 2:
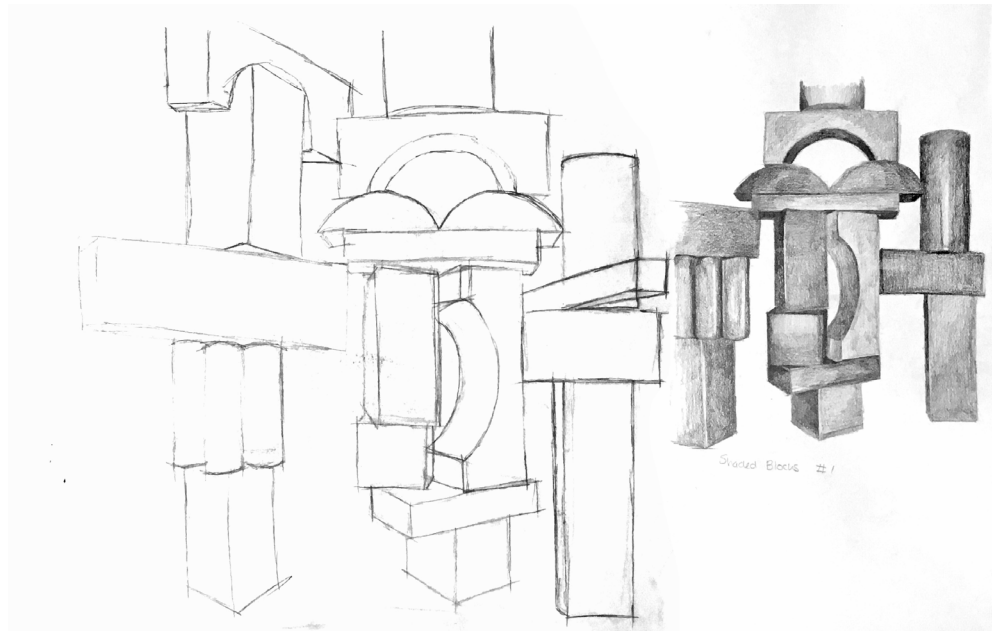Moving tutor positioned in space
(Nicole Tobias 2021).

Figure 3:
Screen projection of childrens'
blocks, pencil measured
(Abigail Hill 2021).

The course is interdisciplinary, both in its teaching – taught as a collaboration between an architect and two product designers; and in its learners – taught to both product design and interdisciplinary architectural students.[3] Registering this range of industrial knowledge, pedagogical experience, and new learners' expectations, the curriculum looks to explore the common ground and the foundational thinking designers of both objects and spaces share. For this reason, the teaching of orthogonal projection is minimal, and the syllabus is mindful that the students will be moving into disciplines that are themselves immersed in the digital production of design proposals — be it form-generating software or information management packages.[4] From within this digital context, the authors understand the role of drawing to have been re-positioned within the design process — away from its traditionally significant role as a tool for communication of the final product and towards a cognitive tool for critical and creative thinking.
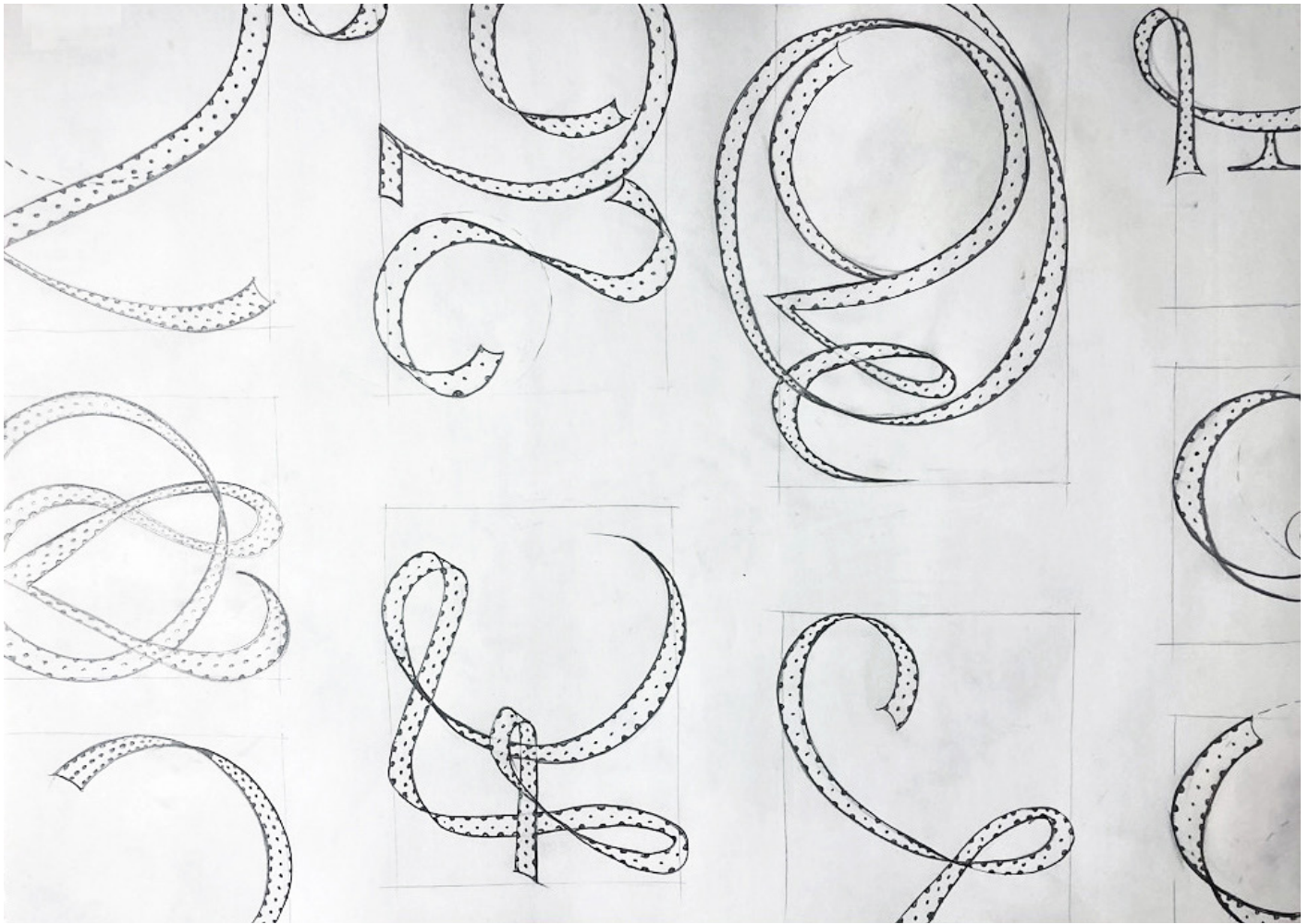
These new learners have easy access to design solutions and take on the answers perhaps without asking themselves the more difficult question of what they, or their clients and users, want. Instead, we observe the new learners of design to be immersed in digital tools and imagery that encourage them to appropriate solutions that, with minimal adjustment, they see as their own. In this course, we hope to encourage a more critical analysis of design and stimulate the design-thinking necessary to question previous and mediated solutions. To achieve this, we see that the critical examination of ideas on paper remains an elementary tool for design planning (for example rule finding, evaluation of 3D shapes, concept ideation) that allows the designer to orient themselves within a complex problem before using digital design tools to further the development of the project.

The course is catholic in its influences, including pedagogies that are observational (Betty Edwards, John Ruskin - Fig.4), experimental (Kimon Nikolaides - Fig.1, 2 & 3), Teel Sale and Claudia Betti (Fig.5), formal (Fred Maier - Fig.6, Richard Hamilton) and explorational — in the study of lettering as drawing, and abstraction (Nicolette Gray, Wassily Kandinsky).[5] The intention of the course is not to teach drawing but to use hand drawing as a method to understand the design skills of:

Figure 5:
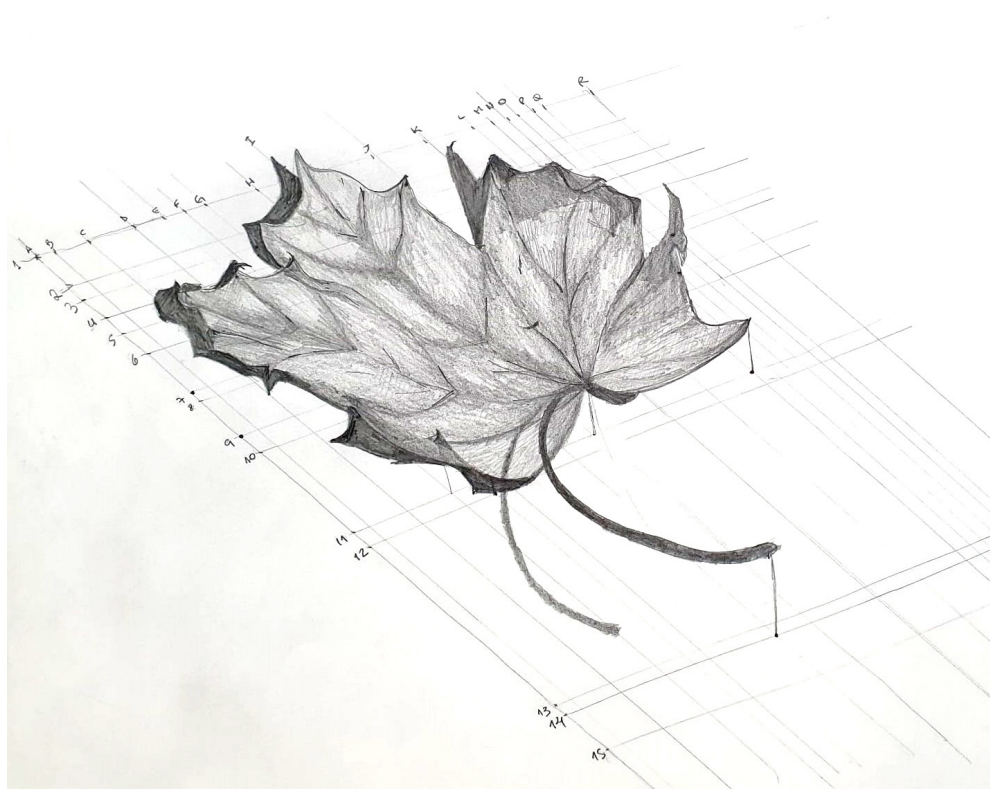Kitchenville, City of Objects
(Elisha Rahman 2020).

Figure 6:
Autumn Leaf re-drawn with 3-d
projection, (Nicole Tobias 2021).

- *observation* – how to look at, record and appreciate design.

- *abstraction* – how to draw out and define the essentials in a design.

- *form theory* – how to understand the underlying geometry of an object and use that structure to explore alternative design possibilities.

- *experimentation* – how to think on paper, make and accept mistakes.

It is this latter encouragement to experiment that has always been challenging and uncomfortable to the new learner of design. The backgrounds of our students are varied — both UK-based and international, predominantly 18–20-year-olds but including mature students and returners to higher education. One might view the UK-based students as coming from a prescriptive preparatory education that might be seen to hinder the open and exploratory thinking we seek to encourage.[6] However, we argue that these learners are additionally encumbered by their digital environment. This essay explores this problem by outlining a digital metaphor for the students' navigation through design problems. It reflects upon different key threshold-moments in this foundation course that encourage students towards an experimental attitude to design. Underlying this discussion is the practice of drawing as an immediate activity akin to performance and the importance of design school as providing a collective and physical space in which this activity takes place.

We understand that many learners are immersed in an Attention Economy that generates an overabundance of information and a corresponding depletion in attention.[7] The core principle of the internet — allowing anyone to compose and disseminate information sources — results in an overabundance of newly available distractions. And while digital technologies facilitate learning environments that are, arguably, flexible and inclusive of different learners' needs, this problem of an ever-intensifying Attention Economy challenges traditional models of pedagogy. Within this context of proliferating information, educators struggle to find ways to help *digitally immersed learners* maintain focus. The learners' tendency to distraction is amplified by the possibilities for digital access to resources that are in addition to the design studio so that, we suggest, multiple opportunities for access can interrupt a focus on the process. Arguably, this digital delivery encourages a passive consumption of content and an encouragement to learn by rote rather than the incorporation of information into a creative process. We are left with the dilemma of learners immersed in a continuously growing bulk of information about a topic with diminishing time and energy to integrate this information into creative and integrative practice. Instead, the students are left skimming (or rather scrolling) across the surface of a topic with little interrogation of that which they choose to consume. Leading, we suggest, to a temptation to simplify the learning process to a level of convenience similar to on-demand service technologies. The leader of a design studio becomes

one of many voices accessed by the student. A healthy situation, perhaps, but raising the challenge of how to deliver the curriculum of design professions that the students aspire to practice within.

The challenge of losing oneself in design

Teaching this course of drawing for new designers has given us a sense of the increasing mediatisation of problem-solving pedagogies. Drawing an analogy with satellite navigation helps us explain how we see this change in student engagement with learning the process of design.

Using a traditional analogue map, an explorer takes an active part in the translation of a previously made survey into their own lived experience of the mapped terrain. A practised map-user treats their maps with a degree of doubt — accepting the risk that the map, or their interpretation of it, might be wrong — and accepts that the realities they confront may take them by a different route or that they might get lost. This explorer is actively engaged both with their map — as an abstracted representation of the territory that includes their destination; and the territory itself — as an unfolding reality that might not be complicit with its own mapping. In the relationship between the map, user and the terrain, there can be value in getting lost as this may lead to new insights and view-points that may be remembered for future journeys.

GPS navigation — Satnav — provided digitally and on-demand, gives us a separate way of engaging with our journeys through reality. A Satnav journey starts with the user identifying an explicit end-point and is taken forward in a sequence of instructions. The destination is predetermined, travel is digitally mediated, and the traveller perceives their journey as lines and signs presented to them on an information display screen. One can, of course, lose the route — the Satnav might not have up-to-date information on disruptions to the journey. However, finding oneself lost is then seen as a frustrating and unacceptable failure of the technology or service provider rather than something that, in reality, can and does happen and that might lead to unexpected discoveries.

A long-held conception of design is that it is an applied art-practice that encourages students to let go of the anticipation of their destination and become absorbed in their creative journey, accepting that this journey might take them on a different uncertain route or that they might end up somewhere else, or lost. The design teacher may offer a map (as a brief or a structure of interim tasks) that provides a guide to aid the student's own investigations of a reality. The digitally immersed student, though, at least in our experience, is avoiding this exploration and is instead looking for something akin to a *Design Satnav* that will guide a process from a start to a finished design product safely, without deviation from the prescribed route, without the discomfort of checking their location, without uncertainty.

In the former mode, the design process is an analogue map that offers orientation but requires an engagement with the reality of the journey. It is open to interpretation and may support different paths and byways. This follows a tradition of design teaching that asks the student to formulate their own journey through a problem in a creative process that seeks the new and unknown. Experienced designers see this as a central tenet of their discipline – that it is necessary to explore numerous ways through a problem to understand it holistically, map out its possibilities, and discover accidental routes or opportunities that enrich a potential solution. This indeterminate exploration helps a designer to be lost in a problem and make mistakes, where misguided routes uncover useful paths that might be immediately helpful or might be used at some other time. In this mode of travelling, uncertainty carries value because it may lead to opportunity and possibilities beyond the status quo. By analogy, one might see this analogue map as a framework through which to encourage the student to get lost in their design process and, in the time-honoured (and, from the student's view, possibly annoying) gnomic utterance of the design tutor, to 'see where it takes you'. This map acts as a threshold for a way of negotiating a creative world that is open and unclear. Crossing this threshold has always been a challenge for new learners of design (the authors included). However, the advent of creative journeys with end-points pre-defined by technologies such as Design Satnav and AI (Artificial Intelligence) offers the digitally immersed learner a short-cut from the difficult route through creative work.

For the digitally immersed (even more so now than when this geography student was surveyed): 'I've got my Satnav, it's alright!'.[8] For those that use it, digital technology has replaced both the physical map and the skills needed to interpret an analogue map. This reliance on the digital can lead to extreme distress. To be deprived of a GPS device in a new place can lead to anger, both that the digital is not available, and frustration that the alternative requires 'the need for greater self-reliance [in] having to find alternative wayfinding'.[9] We argue that this reliance on digital wayfinding extends beyond the geographical to modes of investigation that include the exploration of creative processes. GPS Apps can be seen as a way of negating the discomfort of being lost as a way of exploring the world creatively. They can also be seen as an expression of the Attention Economy's creation of on-demand solutions, ready-made and instant, immediate, and accessible.

The adoption of a Design Satnav reinforces a surface-level of learning using pre-established ways of working. We can see this both in students' approach to drawing and in their design processes. Students bring a stylised approach to drawing to their design communication, with affected *Manga* characterisations that are often skilful, and sometimes beautiful, but do not engage with the test and translation of the reality of their surroundings required for observational drawing. Or, in precedent analyses that become a collection of images, without the analytical study of design principles that underlie a previous project and that might be synthesised and applied to

a new problem. Precedent research easily slips into plagiarism. Learners consume design images changing only an insignificant detail, or a design form may be downloaded to solve the problem. When accused of passing off others' creative work as their own, learners struggle to understand why this may be problematic – *hasn't their Design Satnav solved the problem?* With commodified short-cuts such as these, the Design Satnav provides a comfort and ease of use that is difficult to challenge, whereas an encouragement to switch off the Satnav and get lost in a design problem leaves them disorientated and stressed.

Challenging the Design Satnav as the contemporary students' preferred way of working should therefore be considered carefully. Such a challenge to the digitally immersed student might be seen as another way in which a traditional pedagogical culture enforces assimilation into a professional design culture. In a learning culture that is becoming aware of, but is not yet fully addressing, the growing mental health issues associated with architectural education, this sort of challenge should be treated with caution.[10] Yet, it would seem important to make that challenge. Developing students' self-confidence and comfort with open-ended problems remains central to the discipline of design.

With this analogy in mind – of the digitally immersed learner reliant on a Design Satnav and seeking pre-made solutions through their distraction and digital immersion in an Attention Economy – how do we teach the art of process, of becoming absorbed in a project, and how do we support our students in developing the self-resilience to get lost in a world of design possibilities?

An analogue map for thinking through drawing

In teaching this course, the authors seek to, gently and supportively, challenge the assumptions of a digitally immersed learner — both in terms of their physical drawing habits and their conception of what it is to draw for design. A working method and the habits that inform that way of working are, of course, interlinked, but here we will separate these operations so that we may understand the narrative that informs our conceptualisation of drawing for design and see how the physical habits of design and drawing practice can encourage a mode of thinking. We suggest that in terms of both concept and activity, this teaching seeks to challenge our students' digital immersion and their reliance on a Design Satnav. In this course, we encourage students to find a more engaged and deliberate mode of investigation.

Firstly, we will discuss the forms of physical engagement the module requires because, by first establishing a way of working, a reconsideration of how one might explore design drawing can begin to emerge.

Activities in the module can be seen as a collective experiment in drawing. All learners and teachers are issued with the same equipment. These prescribed weights of paper, specific pencils and pen thicknesses can be seen as the props for the weekly performance.[11] At weekly sessions, the learners and teachers share space and engage with ways of drawing. Teaching sessions proceed as a series of drawing tasks, introduced verbally, sometimes referencing digitally projected visual content, and at other times tracking live movement or forms. Each session concludes with the presentation of a weekly *homework* assignment, taking the form of a short design brief for one or more drawings, the technique or approach which relates to or builds upon the related teaching session. Each session begins with the collaborative review of the previous week's task and a discussion of six or more students' work. Lecturers take care to choose work of varying levels of skill and confidence and draw out the qualities of all drawings presented. This discussion is always constructive (at the introductory session, it is declared that all students' work must be respected), the courage to volunteer one's work for display is praised (sometimes with agreed anonymity for the drawer), and those that have their work shown are given a round of applause. In summary, the sessions have characteristics of a live and improvised performance, using precisely chosen props to conduct acts of creative expression that may be shared with a wider public.[12] The activity is immediate and difficult to predict, which forestalls the control of outcomes offered by the Design Satnav. The students commit to entering the unknown and to completing the activity at that point in time.

This performative approach to drawing is learnt over the module's two semesters (22 teaching weeks). At the beginning of the course, we reflect with the students on how fragile and limited their concentration span is. Their concentration strengthens and extends week by week, and the drawing performances requested from the students expand in the time period and risk. Then, as confidence grows, time periods for drawings reduce and playfulness replaces risk. Through managed moments of live performance, the students become more capable of orienting themselves within open-ended and loosely defined tasks and more confident in being unable to predict the output of these investigations. In short, they begin to explore design drawing without the aid of a Satnav.

This mode of practice becomes central to work in the last quarter of the course, which *gamifies* design drawing as a sporting activity that exercises the *drawing muscles* with fast-paced, timed activities that ask students to respond quickly with multiple drawn iterations of a visual cue. These activities are presented to the students as following a key principle of computer games – one can lose, click *re-start*, and begin again, seeking to move up a level – iteration leads to improvement. However, whereas a computer game offers a limited exploration solely within the parameters of that game, these drawing games offer no prescribed route to unlock the next level. Instead, in these drawing games, students are asked to explore the tasks for themselves, towards their own ends.
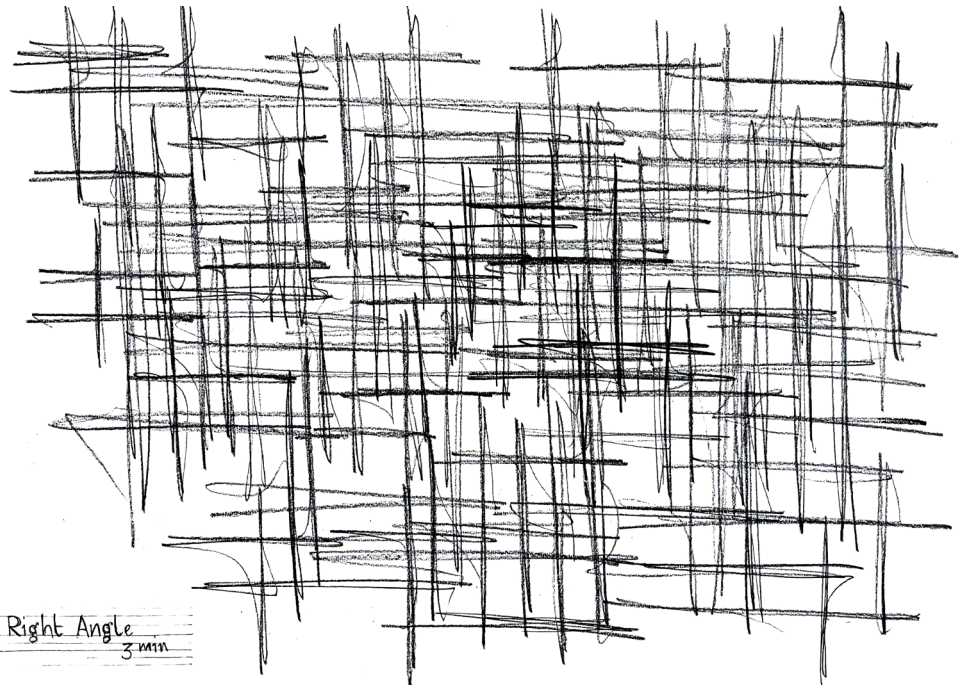
Figure 7:
Drawing using right angular gestures (Daniel Shrimpton 2022).

These repeated exercises require the students to act in the moment, and this speed of working precludes time to access digital streams of information. The requirement for multiple drawings means that there is no time to consider the refinement of an idea or perfectionism. So, the Design Satnav's temptation to fix one destination point is again destabilised. The primary aim of these activities is that the learner understands their sketches as one of many steps in an exploratory process and not a final drawing.

Importantly, we argue, these modes of working require a collective physical space. For the digitally immersed learner, their attention competed for, atomised and individualised, this space and performance provides students with a shared place within which they can support each other in learning drawing for design.

Self-made maps for losing oneself in creative work

Returning to our mapping analogy, if the spatial and performative aspects of this drawing course resist the Design Satnav and temper its Siren call to the digitally immersed learner, then the conceptual narrative of the course encourages the students to formulate an alternative map that is self-made and open to change. The user determines the end-point and one's route to it — an alternative more akin to a traveller's engaged interaction with an analogue map and the territory it surveys. Looking back over the delivery and reflexive development of this module, we now have some understanding of the teaching narrative through which students can create this map. We explain it by presenting key drawing tasks that demonstrate thresholds in the development of the students' thinking-through-drawing.

Exploratory drawing

The first weekly assignment of the course is to make a series of seven drawings each with a different gestural constraint on the drawing movement.[13] The students are instructed to draw continuously for defined periods of time and use the full area of their A2 books. These are modest exercises in concentration and physical stamina and explore the learner's willingness to become absorbed in a process without end. The drawings chosen for review at the next session are discussed in those terms and with reflection on the drawer's ability to find and explore an abstract rule; or, in some cases, the temptation to make figurative or symbolic images (Fig.7).[14] The discussion of these drawings is framed by the qualification that there can be no right or wrong answer but that there are attitudinal qualities that are better demonstrated in some drawings than others.[15] Through these first drawings, and our discussion around them, the students negotiate a first threshold concept of what the purpose of drawing for design is — that the outcome is less important than the process of exploring a method through the act of drawing. These are the first drawings that encourage students to get lost in a process, and we see the process of making these drawings as our primary step away from a Satnav approach to design.

Abstraction

The focus of the second semester moves from observational to design drawing and begins with a sequence of studies that lead to a consideration of abstraction as a design tool. We use Wassily's Kandinsky's compositional analysis to introduce the process of abstraction. Students are asked to first draw a spatial assembly projected on the screen and then to reduce their version of this composition in a series of drawings using progressively fewer lines in progressively shorter time periods (Fig.8).[16] The question is posed to the students as to where the process of reducing the constituent parts of a composition towards abstraction may lead and at what point is figurative meaning dissolved in this abstractive process. Paired students swap drawings and are asked to 'simplify, reduce, over-simplify' the other's composition.[17] Their aim is to identify the iteration that is closest to abstraction yet not without legible composition and then make a further composition based on that chosen stage of abstraction. Reflection on these ideas of reduction leads to the next assignment, which introduces Kandinsky's abstract analyses of images of the dancer Gret Paluca and asks the students to apply this approach to abstract analysis using images of contemporary dancers.[18] The students are encouraged to create several iterations of these drawn studies and to refine these in their consideration of design and line-weight (Fig.9). At the next session, the students' work is compared and discussed with an emphasis on the importance of self-defined rules, the definition of those rules in the abstract and the capacity of a compositional rule to generate design variations.
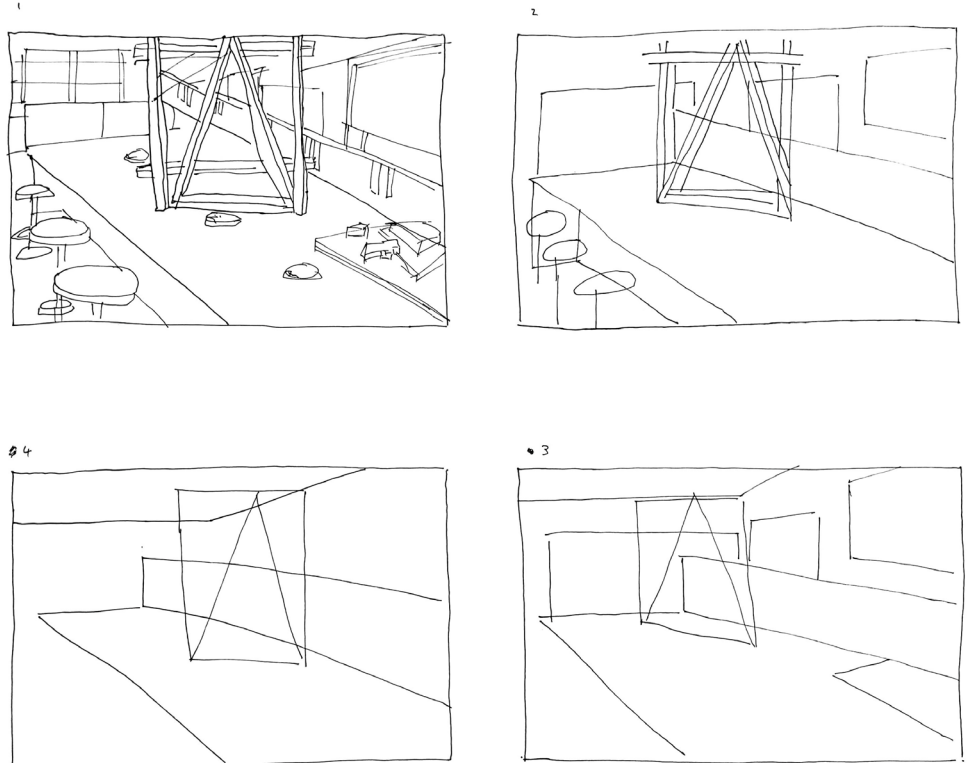
Figure 8:
Compositional abstraction (applying
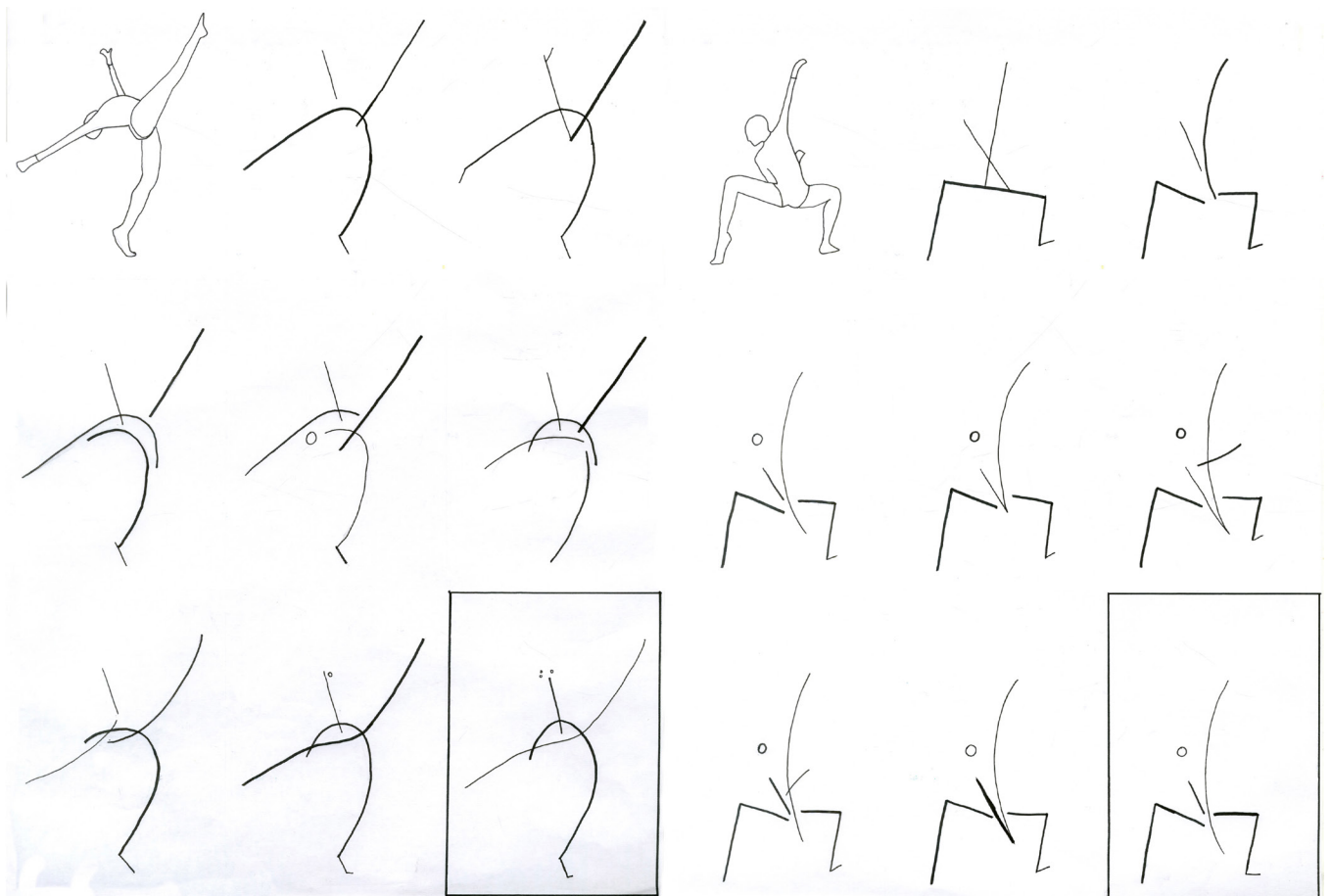Kandinsky) (Yakub Surti 2021).

Figure 9:
Dance Curve abstractions (applying
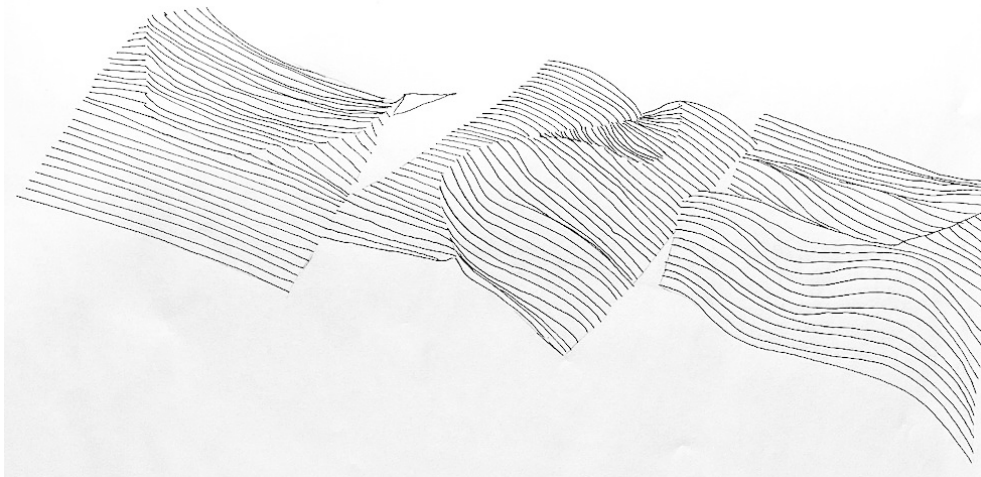Kandinsky) (Abigail Hill 2020).

Figure 10:
Contour analysis of curved paper folds (Adam Amawi 2021).

Figure 11:
Abstract analysis of cue-lines (Mina Fulton 2023).

Form theory

This process of investigating abstraction can be seen as an encouragement to the students to develop their own mapping through a problem and to use this self-generated structuring of a proposal to develop alternative designs — (literally) drawing out the essential characteristics of a form. These visual cue-lines (as product designers might term them) become the form-theory for a design problem and are used to generate new formal possibilities for its solution (Fig.10 & 11).
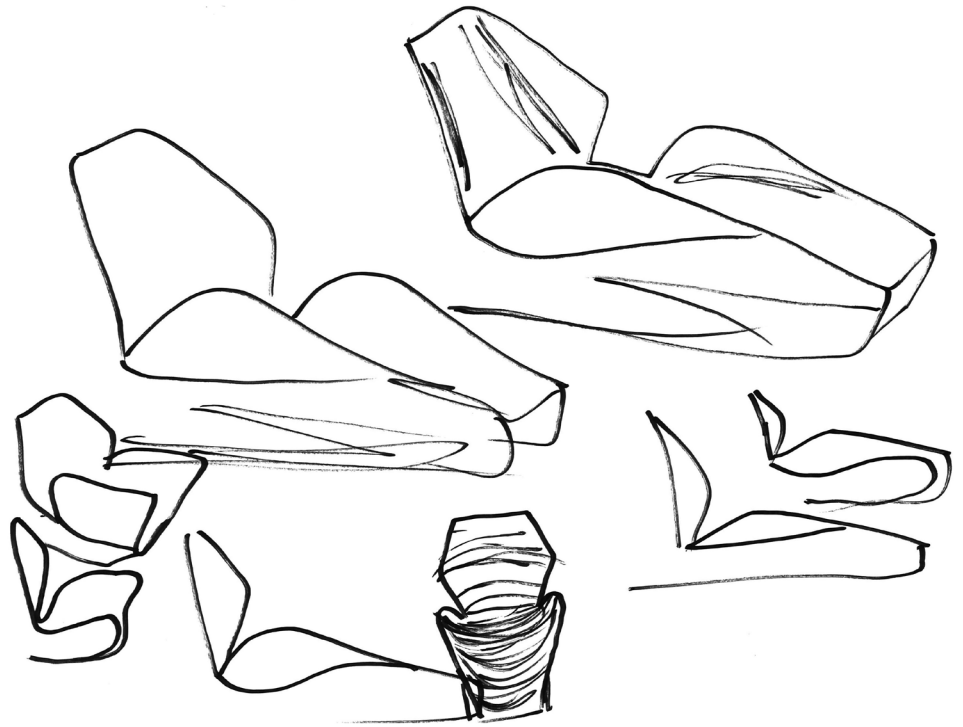
Gamification

As mentioned above, sessions in the last quarter of the course ask the students to flex and develop their drawing muscles in short *bootcamps* that introduce each session. These lead the students through fast-paced tasks, showing images of complex design forms and asking them to draw them quickly and from different unseen view-points — so that students must imagine the underlying formal structure of this shape and re-construct it from different perspectives (Fig.12). Sometimes the images revisit forms or drawing techniques that have been performed in previous sessions. Time for each drawing is kept noticeably short, leaving little-to-no time to overthink, seek perfection or question the purpose of the drawing. In these *warm-ups*, we also ask the students to confront their fear of failure. To this end, time per drawing is made too short — to the point of the ridiculous (15 seconds!) — demonstrating that failure to complete is inevitable and has no grave consequences — it is a game to be reset and re-played. This perception of deliberate failure to fully replicate the presented image is discussed in alternative terms as a way of finding another purpose for drawing — as a designer's process of sketching (or rough scribbles) and as a form of study (immersing oneself in the shape or visual identity) rather than to produce a definitive and resolved outcome. In this way, the Design Satnav's temptation to fix one destination point is again destabilised. At the end of these warm-ups, learners and teachers discuss the emotions attached to this boot camp and *how it felt*? This discussion reflects on shifts in attitude these fast-paced sessions encourage — the crossing of thresholds in concentration, form study and acceptance of accident and imperfection so that an open exploratory engagement with drawing can be taken forward. A way of striking out into fresh territory with a self-made map (an abstraction of reality) that can be

used as a guide by which new routeways through design can be found, and not necessarily with a destination defined by a Design Satnav. As a student describes here:

> I think that this year's slow introduction to drawing skills has been fascinating because of the psychological thought process it entails. Previously I had wondered why we had strange drawing tasks, but I understand it's to build confidence and the ability to look at objects and designs from all perspectives, even creating forms out of abstract images.[19]

Conclusion

The sketching tutor's provocation (accompanied by the flourish of a 4B): *Just this, for all that!* is answered by the digitally immersed learner's retort: *I've got my Satnav, it's alright!*, while scanning the skyline with a smartphone. For the sketching tutor, hand drawing is decision-making — a process by which the sketcher edits the world around them, making decisions through the act of drawing on what to attend to and how to investigate it. Our concern here is that new digitally immersed learners surrender their powers of decision-making to digital artifice and act by Design Satnav — possibly without realising that this is what they have done. So that, in Maggie Jackson's pessimistic analysis of our impending Dark Age of distraction:

> Smitten with the virtual, split-split, and nomadic, we are corroding the three pillars of our attention: focus (orienting), judgement (executive function), and awareness (alerting). The costs are steep: we begin to lose trust, depth, and connection in our relations and in our thought.[20]

Our aim is to teach design drawing as an exercise in finding focus and developing judgement. And to do this as a shared and collective activity that stimulates an awareness of the world.

We are cautious, however, of the conclusion that design practice is now corroded by the digital and conscious that hand-drawing cannot act as a restorative to a redundant approach to design practice. Design has changed, and the place of hand-drawing within that practice has also changed.

As undergraduates, both authors recall being told by an older generation of architects and designers that students no longer draw properly, and there is a danger here that we are seen to continue that traditional lament. We are aware, however, that contemporary design drawing is an unstable currency. Our intention here is not to mourn drawing practices that have become irrelevant to our students' professional futures.[21] Instead, we are concerned that our students' digital immersion provides an additional threshold for them to cross before learning *how to design*. The ease of expression and multiplicity of productions offered by digital design tools allow any way forward, but how does a learner of design find a direction? Or, more precisely, find out how to

find a direction? And how to uncover what is of value within a design process? We suggest that these questions might partly be addressed by an enhanced role for drawing as a preparatory method of engaging with the challenges of a creative design process. That is, by providing a physical moment in time and space to manage the Attention Economy; and, through the exploration of processes of abstraction and form theory, to negotiate the threshold of becoming confident and able to get lost in design. The discovery of this confidence is noted by one of our students:

> My resolutions for a superior design practice as I leave foundation will therefore be to continue making errors and feeling confident with them as they will result in a better outcome and understanding.[22]

But if one has access to a Design Satnav, why seek to get lost in the process? There is a general temptation at the beginning of a task or project, to value the realism one can generate with a touch of a button. This encourages a shift in what is valued by the learner away from an exploration of ideas and towards the production of images where the quality of digital representation is valued more highly than the idea itself and the expertise gained by the investigation of ideas through design iteration. We offer our approach to the teaching of foundation-level drawing as a way of challenging the Design Satnav, arguing that the performance of drawing tasks in a physical teaching space builds confidence. The exploration of principles of abstraction provides the tools for students to switch off their Satnav and begin to explore design drawing as an open-ended and creative enquiry.

In an age of abundant information and dwindling attention, one wonders whether design educators should focus more centrally on the quality of attention learners bring to teaching environments by providing performative *places of learning*, immediate and unmediated spaces in which learners focus on curated pieces of information, mindful discourse and their engagement in a creative process.

REFERENCES

1 Relayed by Roger Conlon of UWE, Bristol's Fine Art Department, in an interview with James Burch on 3rd February 2011, as a challenge made to him by his drawing tutor Norman Blamey.

2 An earlier version of the argument was presented as a paper at the UWE, Festival of Learning in June 2022, and we are grateful to our colleagues for their discussion of our ideas at this event; Bianca A. Barton, Katharine S. Adams, Blaine L. Browne and Meagan C. Arrastia-Chisholm provide a balanced assessment of the effect of social media on student performance in their paper 'The Effects of Social Media Usage on Attention, Motivation, and Academic Performance', *Active Learning in Higher Education* (22) 1 (2021), 11-22, which notes the mixed results of their own and previous research but warns of 'the potential negative effects high social media usage may have on students' academic performance' concluding that 'focused attention should remain on strengthening attentional and motivational strategies to facilitate academic success' (p.19-20), which is a subtext of this paper. In contrast, Abraham E. Flanigan and Wayne A. Babchuk's 'Social Media as Academic Quicksand: A Phenomenological Study of Student Experiences In and Out of the Classroom', *Learning and Individual Differences* (44) (2015), 40-45, give a decisive warning to educators that social media is seen as a constant temptation by students and not viewed by them as a means by which to advantage their attainment of skills and knowledge.

3 This syllabus began in a previous collaboration for first- year architectural studio teaching between James Burch and the architect/fine artist Andy Bradford. The current course has always been taught with the automotive stylist and product designer Doug Barber, and in 2017-18 the module also included teaching by the product designer Andy Gray. We are grateful for these colleagues' contributions to the development of the scope and pedagogy in this course; The module usually has a cohort of between 50 and 70 students comprising students from BA Hons Architecture & Planning, BEng Hons Architecture & Environmental Engineering, BSc Hons Architectural Technology & Design, BA Hons Interior Architecture, BA Hons Product Design and BSc Hons Product Design Technology.

4 Regarding the teaching of orthogonal projection, our view is that plan/section/ elevation is of limited relevance to the design of product and, arguably, has a diminishing role in architectural design. Where these conventions are relevant, they are taught further up in the School.

5 This taxonomy of pedagogical approaches is borrowed from Seymour Simmons' 'Philosophical Dimensions of Drawing Instruction', in *Drawing: Research and Development* ed. by David Thistlewood (Essex: Addison-Wesley Longman Ltd, 1992), pp. 110-152.

6 See, for example, Andrew Chandler-Grevatt, 'The Wilderness Years: an Analysis of Gove's Education Reforms on Teacher Assessment Literacy', *Buckingham Journal of Education* (2)1 (2021), 101-117, which discusses the UK Coalition Government's education reforms led by Michael Gove between 2010 and 2014 that replaced what was seen by the Government as an overbearing regime of coursework and class-based assessment with fewer and higher stakes formal examinations.

7 Herbert A. Simon, *Designing Organizations for an Information-rich World* (Baltimore: Johns Hopkins University Press, 1971), p. 40-41.

8 Janet Speake and Stephen Axon, '"I Never Use 'Maps' Anymore": Engaging with Sat Nav Technologies and the Implications for Cartographic Literacy and Spatial Awareness', *The Cartographic Journal* 49:4 (2012), 326-336 (p. 334).

9 Janet Speake, "I've got my Sat Nav, it's Alright': Users' Attitudes Towards, and Engagements with, Technologies of Navigation', *The Cartographic Journal*, 52:4 (2015), 345-355 (p. 350-51).

10 David McClean, Peter Holgate and Lyndsay Bloice, *Mental Health in UK Architecture Education: An Analysis of Contemporary Student Wellbeing. An Initial Study* (Aberdeen: Robert Gordon University, 2019).

11 These theatrical props include the Product Designer's Blue Pencil. This magically soft waxy indigo blue drawing pencil can affect the softest brushed strokes through the darkest hard-edged tonal values in ways never experienced by a student new to design drawing.

12 The nature of drawing as a mode of performance and the related possibilities this carries of public exposure and stage fright were raised by Roger Conlon of UWE, Bristol's Fine Art Department, in an interview with James Burch on 03rd February 2011. In his view, students can be afraid to draw 'because there is a disclosure of identity in a drawing and this requirement for a performance'.

13 Teel Sale and Claudia Betti, *Drawing: A Contemporary Approach* (Boston: Wadsworth, 2008).

14 An alligator formed from triangular gestures, a face from spiralling linework, or – this year – a rectilinear Sponge Bob Square Pants […].

15 […], but let's face it, drawing Sponge Bob Square Pants in this context is as close as you can get to wrong.

16 Herbert Bayer and Walter Gropius, *Bauhaus 1919-1928* (London: Charles T. Branford, 1952).

17 Robert Wyatt, *Left On Man* (Stationfields: Rough Trade Publishing, Hannibal, HNCD1436, 1991).

18 Susan Funkenstein, 'Engendering Abstraction: Wassily Kandinsky, Gret Palucca, and "Dance Curves"', *Modernism/modernity* (14) 3 (2007), 389-406; Morwenna Ferrier, 'Leaps and Bounds', *The Guardian Weekend* (10th October 2016).

19 The module includes a reflective design journal from which this anonymised diary entry has been included.

20 Maggie Jackson, *Distracted. Reclaiming Our Focus in a World of Lost Attention* (New York: Prometheus Books, 2019), p.219

21 James Burch, 'Architectural Drawing: The Culture of Learning an Unstable Currency', *Charrette*, 1(1) (2014), 20-35.

22 An anonymised diary entry from a different student's reflective design journal for the module.