SURGEONS & MAGICIANS

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AUTOMATING DESIGN EDUCATION AS INVESTGATORY METHOD

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CONTENTS

PREFACE

This project aims to investigate discursive patterns within the Design department at Goldsmiths University of London, by attempting to identify and algorithmically replicate clearly defined elements of the design process. This research led analysis will aim to deconstruct the multitude of techniques that students, tutors and researchers use to engage with design discourse. By framing these investigations with machine automation techniques, the project and accompanying report will question the relationship between technology, creativity, labour and academia, with the aim of coming to a better understanding of the changing state of higher education and design culture, whilst acknowledging and taking advantage of my position as a both a participant and a product of these systems.

ABSTRACT

The report begins with an introduction in two parts: commencing with the power dynamics of machine automation, paying particular attention to “white-collar” workers automating their own jobs; before moving onto contemporary changes to the economics of higher education, and how this may be shifting students’ attitude to academia in general. I propose that in applying the methodology of automation to design education, an investigation into various problem spaces, and the relationship between them can be pursued.

I explain and contextually situate my preliminary research findings and practice across three sections, all of which focus on Goldsmiths, University of London’s BA Design course:

Firstly I turn my attention to automating the system of teaching and communication: investigating existing marking procedures and examples of current automation techniques in the sector, before moving onto linguistic analysis of Student / Tutor communications.

Secondly I move onto automating the student’s input into the existing system: interrogating the difference between a project as an artifice and design as a practice; before deconstructing the production of the “project” using discourse analysis techniques. It is here that I explore the apparent “cult of academia” that is revealed in my findings, and how culture is embedded in education and particularly Goldsmiths Design academia, before asking if this phenomena is a product of, or requirement for, successful project submissions in the institution.

Thirdly I explore the materiality of critical design discourse by running investigatory workshops with students. Subsequently observing and researching the notion of self-automated design practice as an existing sub-conscious technique, and to what extent the atmosphere of design education reinforces this.

I conclude by situating my own project and research into these narratives: proposing that automating an assessment submission in this way requires a deep understanding of the creative and administrative process on every level, which is a valuable academic endeavour in of itself; as well as producing a functioning set of tools to offer agency to the student in the education assessment dynamic, the effect of which continues to be an ongoing investigation.

The report is structured to provide supplementary contextual situation in footnotes throughout. Figures of prior art and my own practice can be found in plates at the end of each section, where applicable.

INTRODUCTION
PART ONE

This body of work began by broadly investigating how automation [in every sense] is currently effecting society, moving past the direct implications of labour relations, and into the far reaching consequences of those shifts. What I began to discover is that the core emotional and strategic changes to the way that people work when machine automated labour is a factor, is consistent across many different circumstances. These parallels can be seen in various sectors and the climate of modern productivity escalation is causing labour relations and strategies to be applied in diverse areas such as education and wider public policy.

A phenomena that has been occurring more recently, with the advent of computational ubiquity within "white collar" work, is the advent of algorithmic automation of clerical duties. This task is performed by programmers and engineers who make various components in the labour force more efficient by replacing them with machines that can do their job faster, more efficient and often in a centralised manner [Dormehl, 2014]. The advantages to the company here are numerous: it increases profit margins in some cases and allows businesses a heightened state of flexibility and agency over their own practice [Brynjolfsson and McAfee, 2011].

Running in parallel is a curious phenomenon where workers, primarily in these same sectors, are automating their own jobs [Jumašev, 2015]. Not necessarily as a response to the aforementioned strategy of the employer streamlining labour processes, but as a personal decision to make their own job faster and less taxing. What the employee does with the time that this process frees up is variable, but often those who make accounts of this particular technique will use the time for leisure, rather than informing their employer of the optimisation: to do this may run the risk of essentially making themselves redundant. [Hello Internet, 2014] These tools therefore become secret devices, used to "game" their own act of employment.

It is in this reframing of who authors the automation here that redefines power structures. Often, many of the critics of increasing machine automation are fearful that those who own such "robots" in contemporary society will cause a widening wealth divide, due to an uneven distribution of power and indeed capital [Cowen, 2013; Kaufman, 2015]. What these employees here are doing is using technological understanding and inventiveness to bring agency to their own employment circumstance.

It has been an objective of mine to extract this technique and assess its potential as a methodological tool, with an understanding that its position in labour relations is quite potent and transformative. As a device, it requires an innate comprehension of the task at hand, as well as articulacy regarding the process of technological or otherwise computational machine automation. Its importance is therefore two-fold: as both an investigatory methodology when applied to an unknown process, to aid understanding, and also an exercise in designing appropriate machine automation techniques. One of the functions of this project therefore, is to introduce this particular notion of machine automation into new spaces to test their viability, procedure and impact. It is in this regard, a combination of research, illustration and critique.

To apply this technique in a meaningful way to my own current position I asked myself, "What is my current job?" to which I answered, "To do this degree". This observation is something that must be understood before I can proceed, as the root of even considering education as a "job" is a complex issue that is particularly pertinent to current economic and structural education paradigms.

INTRODUCTION
PART TWO

One might consider the core personal attitude to academic engagement to be the most critical factor in approaching education in a similar way to work. As a participant in the system, a student may apply a typical forty hour a week work ethic to studying; self-managing time and resources; engaging with peers in a professional manner; and of course, considering the economic incentives to preform well, either when taking into account the cost of education or weighing up the potential rewards in employment upon completion. Essentially each student will apply these strategies to a varying degree on a case to case basis.

Aside from these personal productivity decisions which could be seen as derivative of business practice, the economics and management of higher education in a broader sense is important to the discussion. Education has always been constrained by economic considerations and funding in the UK has been traditionally managed by the Government as a publicly funded entity. Alongside these structures, both historically and contemporary, are for-profit variations of education providers, and recently there has been a shift in the proportion of funding that is delivered to the institution by the student.

The tuition fee increase which was introduced in the 2012/13 academic year saw fees rise from a previous cap of £3,375 to £9,000 per year for undergraduate courses. Besides many other socio-economic implications, what this enabled was the accelerated shift of funding from the public to the private sector, [Universities UK, 2014, p. 24]. More recently, politics professors at the University of Sheffield have commented on the "Teaching Excellence Framework" [1],

'One of the most striking elements of the Tef discussion is the use of market language. We have heard much talk of costs, value for money, returns, investments and employment statistics. Ultimately, the student is considered a customer.' [Blunkett and Flinders, 2015]

In this regard, the government is tackling identifiable shortcomings in university education by targeting and streamlining bureaucracy within the system, using the refined tools and inherently political tactics of business management. Compounded with the greater cost of education for the student in recent years, this process invariably frames those students as a consumers, and subsequently reinforces the notion that education is being delivered as a product. What is then clear, is that alongside the students personal perception of the role of education and the economic and productive approaches they pursue when navigating the system, there are larger forces at work that are shaping the role and operation of higher education institutions. Although the student has little say in how these forces act, their behaviour is still distinctly shaped by them.

1.
The Teaching Excellence Framework was proposed by Jo Johnson, the Minister for Universities and Science, in 2015. Among other goals,
'...sets out proposed new architecture for the higher education system, to reflect the way higher education is now funded by students, and to reduce the regulatory burden on the sector.'
[The Secretary of State for Business, Innovation and Skills, 2015, p. 7]

One anonymous higher education academic comments,
'The government is intent on pushing for a competitive marketised system, in which measures like the Tef will assess teaching according to student (customer) feedback and graduate earnings data. This will inevitably have consequences for those caught up in the delivery of these services, and teachers will face even greater scrutiny and pressure.' [Anonymous, 2015b]

If recent socio-political decisions have apparently caused transformative trends regarding the attitude towards higher education in the UK [Higher Education Funding Council for England, 2013], then the understanding and reactionary strategies of various parties in the system will continue to be diverse and prototypical as the situation matures. What is apparent, is that the general feeling among academics and educators is one of caution and apprehension, while students act in accordance to the new economic climate with a comparative lack of experiential perspective on how the sector has changed over a wider timeframe.

If education is indeed transforming into a product then this would go some way to explaining the recent observed behaviours of some students in higher education,

'I spoke to a colleague from a university I used to work at – he had experienced the same thing. "They seem to think they are buying a degree, rather than working for it," he said. Learning has shifted, we realised, from an intellectual achievement to a commodity... I recalled the student who told me he was disappointed with his low grade because he had "paid so much money".' [Anonymous, 2015a]

Others argue, particularly with regards to the co-design of higher education curriculums, that economic incentives to succeed lead to students participating to a greater extent, and particularly in the underlying structure of their education experience,

‘Alex Neill, the pro vice-chancellor for education at the University of Southampton who has led the development of Southampton Opportunity, (comments), “What the introduction of fees has done is make students much more inclined to take their studies seriously,” he says. “The idea that you just go off and drink your way through three years has gone. So if you go to students and offer the right type of opportunities, the likelihood is that we will see more of this, not less.”’ [Havergal, 2015]

Broadly speaking, on the one hand we have the increasing conflation of business and education practice, where educators and students must adapt, for better or for worse to this new situation; and on the other a desire to strip back the culture of incentivisation and bureaucracy, that some believe plague the education sector.

Within the context of my project, I am interested in pushing this conflation of business and education practice, to investigate how a speculative “ultra efficient” model of education participation would behave en-situ. Automation as a methodological tool, as I explained in the previous section is therefore applied to education as a critical research device. In the following central chapter I will explain and contextually situate my ongoing investigations and findings in this area.

METHODOLOGY INTRODUCTION

If it is my job, as I alluded to earlier, to complete this degree, and it is being framed in such a way that machine / algorithmic automation could make the process more efficient, then how could this system be designed?

A prerequisite to automating any process is deep understanding of the system as it exists in its current state. Steps can then be taken to either replicate those actions in a computational sense or redesign the system in order to better translate that original process into something which can be more efficiently approximated with algorithmic or mechanised systems.[2] This understanding is approached by mapping the frameworks and actors that are necessary, primarily in this instance, for obtaining the qualification awarded on the completion of this course. In addition, I address at various stages the importance of other goals, such as the student's capacity to obtain and contribute to academic discourse; the institution's role in providing education; and ultimately, for all parties, producing "good" design.

I broadly define as two angles from which to approach the task of "automating my own design degree":

1. Automating the degree as a system:

Working on automating the structure, where the individual student works as they would normally, surrounded and supported by automated frameworks to facilitate learning / designing etc.

2. Automating the process as the personal:

Working on automating the individual's response to the existing education system, where the student aims to design/create/respond using algorithmic production methods. This could be interpreted as a subversive/transgressive act.

The following sections will explore both of these pathways, in turn.

2.
Herein I exclusively discuss computer controlled methods of automation as opposed to mechanical devices or repetitive sequential control processes. This does not however rule out the opportunity to use those devices in subsequent research iterations.

AUTOMATING THE EDUCATION STRUCTURE

It is an academic necessity that students are in some way assessed to validate their learning and progression throughout their course. These structures appear in various forms throughout the English education system, with each level deviating further from a hard and fast criteria as they progress. The mode of assessment in arts education, is one that involves a certain degree of tension between nuanced, tacit understanding of submitted work and a somewhat algorithmic calculation of achievement. [Hulks, 2003; Rayment, 2007]

These calculations of achievement are built around carefully structured sets of descriptors, and to some extent, exhibit evidence of automation in its current state. [*Figure 1.*] Nuanced judgments of the quality of work are categorised according to set descriptors, and importantly, transformed into data which can then be inputted into algorithms that grade submissions, ultimately quantifying success.[3]

Although the presence and understanding of these existing structures is important to my investigations, I am more interested [with regards to the context of machine automation's role as a transformative agent in human-labour relations] in the way that current human-human interaction orientated components in the system could be in some way automated.

3.
To fully automate the system of education may introduce a recently observed situation in self-service retail,
'In this case, we are allowing consumers to perform the exact same job the labourers once did. The position of the grocery store checkout clerk is primed to suffer a fate worse than obsolescence. And so—just like the worker who used to pump gas and process the payment before it was arranged so that the consumer would perform both these tasks himself' [Vorvick, 2014]
The student in this regard, becomes the consumer, serving themselves using automated infrastructures.

One such interaction is the tutor/student relationship, and particularly the interface between those parties in a tutorial, or a setting where feedback from a tutor is delivered [in its various forms].

Tutoring is traditionally a somewhat formalised process, with a delicate procedure. Its position as a very "organic" interface makes approaching the interaction in a computational sense hypothetically quite challenging. It is one of the many interface points between the student and the education system alongside lecturing, technical support, assessment and formalised feedback.[4]

Face to face tutoring is a variable experience, with a multitude of techniques and approaches. The challenge here lies in extracting a kind of distilled pedagogic technique that is unique to each tutor, and indeed, each tutor-student experience. [*Figure 4*.]

Similar to many of the research methods I have undertaken at this stage, my primary focus here is on language, both written and verbal, as a medium primarily used to interface between student and tutor. In dissecting the language used in this context, I can come to a better understanding of method and intent within these observed conversations.

4.
Automating these other aspects of the educational system seem to have been met with more success historically, ranging from entire economic models to tangible machines. [Figure 2.]
Massive Open Online Courses (MOOCs) which have been steadily gaining popularity in the internet age, have a heritage in mail-order teaching, conflating the promise of education with profit- driven strategy
[Watters, A. 2015a]. [Figure 3.]
Furthermore, many distance learning institutions such as the Open University have been using video-based lecture delivery, and online assessment submissions for decades.
[The Open University, 2015]

Alongside verbal feedback for the "territories" presentations in the beginning of the third year [5], tutors submitted a spreadsheet of written feedback which is intended to support and guide the student as they develop their project. This document becomes useful to me due to its pre-prepared, structured nature, similar to a spreadsheet of data. [*Figure 5.*] Working with this document would be faster and more appropriate that other methods such as voice recording or video documentation [though these methods are not discounted as invaluable]. I was given permission by Laura Potter [who is also my studio practice tutor] to use her contribution to this data, to construct what would become an automated incarnation of herself in a tutorial context.

The methods for achieving this were as follows:

The responses from Laura in the feedback form were decontextualised: in that the individualised responses were stripped of all specific action and advice. What would be left is the structural linguistic framework for feedback that would include generic advice, hypothetically pertinent to any student who may need it.[6]

What remains is a large database of language produced by a single member of staff in a particular feedback scenario, stripped of all specificity. These interferences with the standard feedback procedure are indeed altering the observed ritual, however this act begins to distill an overarching technique.

5.
Defined by the department as:
"...the opportunity to clarify and communicate the investigations you have undertaken during the first six weeks. The main aim is to outline the proposed area (territory, contextual field) for your final year work."

6.
Interestingly, the act of decontextualising these sections of feedback highlighted a phenomenon whereby if I was required to delete very little, this meant the feedback was largely generalised and non-specific, the reverse was also observed. Arguably, if the feedback was deleted entirely, due to specific language and references being present, this information should, in theory, be more useful to the student. This assumption is however inconclusive, as general project advice may be more valued by a student who has a less clear understanding of their own project territory or intent. [Figure 6.]

In order to insert this data into what can be more broadly described at a tool, I call upon an algorithm entitled "Cobe" [7]. This program "learns" the feedback text and adopts it as its vocabulary. When a user inputs a question [or any comment], the program will respond with text of varying length, as if engaging in conversation, using the language it has learnt previously. What this constructs is a user interface that essentially allows a student to ask a robotised version of a tutor for advice. [*Figure 7.*]

The apparent presence of what is largely an accurate representation of the original personality of the tutor is striking. This gives a certain authenticity that enables genuine interaction with the machine on a level that approximates the original inputs and outputs, but critically, not the experience of it. Despite this alteration of "experience", the effectiveness of the machine in testing, is proven.

In one case, I offered a third year student the opportunity to use the 'Laura Potter Bot' for a tutorial [for reference, the original Laura is not their regular studio practice tutor]. They submitted an extended question about their difficulties with their current project, to which the algorithm responded with a lengthy reply. [*Figure 8.*] The student commented that the response made sense in the context of their submitted query, and that the questions and comments offered by the algorithm were valid as actions or things to consider, so much so that the student subsequently took further action on their project in response to the generated feedback as if it were an ordinary tutor / student conversation. [8]
[Interview with Humay Meredova, Friday 27th November 2015]

It is in this moment that it is possible to consider the tutor as having been "replaced".

7.
Cobe Script is a modern version of a natural language processing script, created by Peter Teichman. He describes its function as such:

"Cobe is a conversation simulator, originally a database backed port of MegaHAL but a bit more now. In short, it uses Markov modelling to generate text responses after learning from input text. Cobe creates a directed graph of word n-grams (default n=3) from the text it learns. When generating a response, it performs random walks on this graph to create as many candidate replies as it can in half a second. As the candidate responses are created, they're run through a scoring algorithm that identifies which is the best of the group. After the half second is over, the best candidate is returned as the response." [Teichman]

8.
This variation of a natural language processing interaction reflects the experience of one of the earliest notable examples of this technique: "ELIZA", a programming framework created by Joseph Weizenbaum between 1964 and 1966. With the emulation of psychotherapy in its "DOCTOR" program,'Weizenbaum was primarily concerned with the inclination of human users to find sense in the computer's output, and to ascribe to it an understanding, and therefore an authority, unwarranted by the actual mechanism' [Suchman, 1987, p. 24].
A phenomenon which came to be known as the "ELIZA effect" [Hofstadter, 1996, p. 157] .

The same cognitive dissonance is seen here, whereby a user places trust in a computer program, the inner workings and depersonalisation of which they are fully aware of.

The findings so far suggest that it is indeed possible to distill a nuanced interaction such as this into a computationally structured device, and the key to its success relies on capturing the "essence" of the tutors technique, maintaining a sense of humanity through language: to enable more natural interaction, and at this stage forgoing specificity.

I may have simply been fortunate that Laura's feedback technique just so happened to suit this particular method of analysing and deconstructing / reconstructing language. In further conversations with her it became apparent that theoretically, what her students were searching for was simply the "right" question or suggestion that suited their needs. When the algorithm delivers a string of these, any and all of them can become applicable. Other tutors I spoke to regarding this experiment noted that they require an emotional and contextual understanding that this algorithm could not provide. The ability of the tutor to flexibly adapt to the changing needs of a student remains elusive to this iteration of the algorithm. What it does however provide, is the opportunity to explore the algorithmic combination of multiple distilled tutoring techniques, to assemble a more comprehensive experience for the student. An opportunity for further investigation in this regard, remains open.

Although an exciting starting point, it is clear that further investigations are required to understand how this applies to multiple feedback techniques [9]. Its position as a robotised component in a complex and nuanced wider system is promising in terms of fully automating a design education discourse.

This section has highlighted one iteration of automating the structure, the following section reframes the investigation on the student's contribution to the system as it currently exists.

9.
Jimmy Loizeau, who tutors students on Goldsmiths BA Design often prescribes actions to aid project development which could be interpreted as being distilled and seemingly computational in their nature, one of which is "typing a query into google and turning to page seventeen". These specific techniques of advice approximate existing examples of self-defined automated tutoring.

Goldsmiths College: Design Department
BA Design

BA (Hons) Design: Summative Assessment

Student Name:	Year Group: 3
Project: Major Project VIVA	Course: Studio Practice
Date:	Tutor(s):

Descriptor	Exceptional	Outstanding	Excellent	Very Good	Good	Satisfactory	Fail	Bad Fail	Very Bad Fail	Non Sub
Classification	1st	1st	1st	2:1	2:2	3rd	Fail	Fail	Invalid Attempt	N/A
Grade	90%-100%	80%-89%	70%-79%	60%-69%	50%-59%	40%-49%	25%-39%	10%-24%	1%-9%	0%
Concept										
Project ID										
Research										
Process										
Outcome										
Communication										
Management										
Overall										

Comments:

Tutor signature:	Date marked:

BA_DES/Summative_Assessment/LJP_2012

Figure 1. Goldsmiths BA Design Marking Criteria

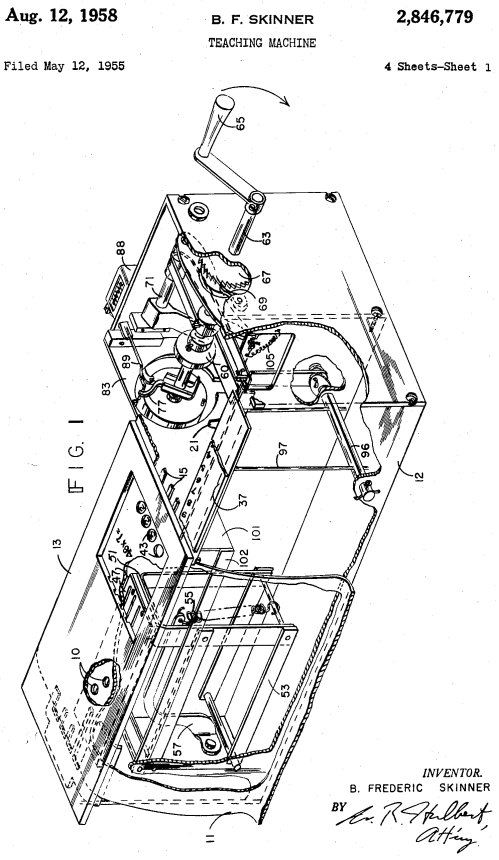

Figure 2. Teaching Machine Patent, [Skinner, 1958]

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JUNE 1970 | 35

Figure 3. McGraw-Hill Computer Programming Mail-Order Course Advertisement, [Watters, 2015]

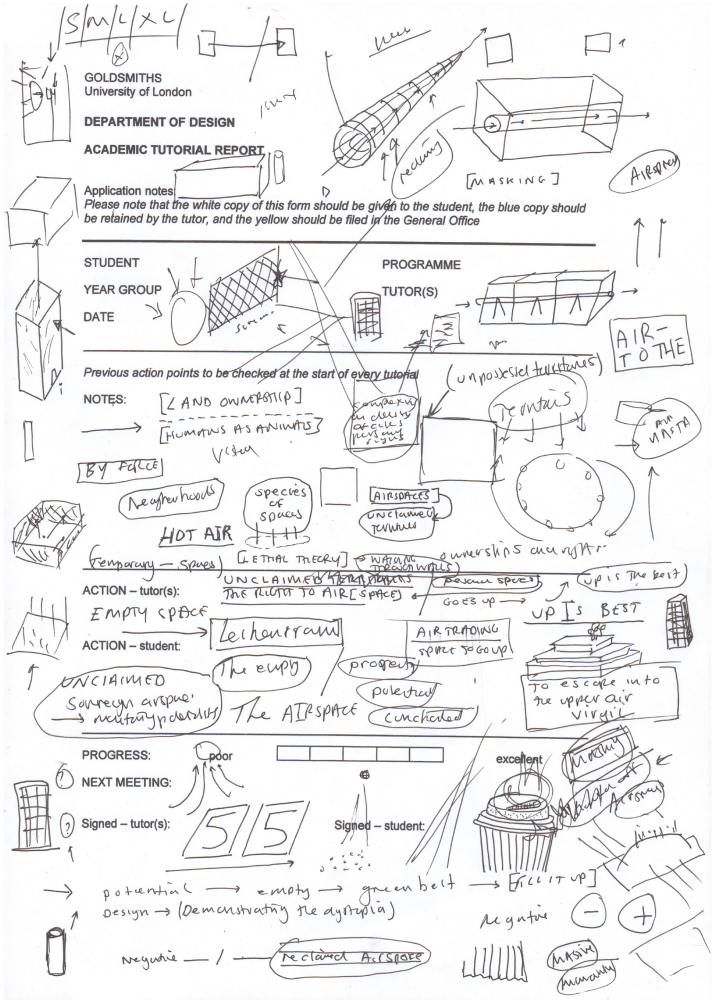


Figure 4. Goldsmiths Department of Design, Academic Tutorial Report - Courtesy of Stuart Bannocks and Signe Greve

MON 9TH NOVEMBER				
Student		Notes	Advice	Advice
Ola	Leila	NHS research/ needle phobia. Tatooist doctor. Altering needles. Power over fear. Cheating because of not using hypodermic needles. Why am I afraid of these needles. Timeline of phobia development. Last week event: interviewed paramedic. Phobia developed in youth from maltreatment doctors and nurses. Science Museum/fear. Philosophy of fear CBT. Fear = creativity. CBT cannot sure a fear. Exposure therapy, but this is controlled and difficult to replicate in uncontroled situations.	OK this seems clear. Good set of forward facing tasks. Good analysis. Focus on who this project might be aimed at: patient or healthcare worker. What is it you want to solve?? Fear and creativity: fear helps to create new solutions to problems. Maybe find ahealthcare worker who is needle phobic? Wellcome collection. Acupuncture, Mark Lithgo. Placebo acupuncture: is acupuncture real? Mindful of research methods, this feels like it is a documentary project right now. Beware of NHS traps. Easy to see lots of doors closed.	TERRITORY: NHS, PHOBIAS, FEAR, NEEDLES, THERAPY, DOCTORS, CHILDHOOD TATTOOS. A well mapped out territory - include all of the above Look at more extreme situations where someone has a possitive relationsl with needles - tattoo enthusiasts rather than blood donors (difference betw people who do it altruistically and those who enjoy the sensation) Visit the Old Operating Theatre, London Bridge, timeline development of medical instruments Beware of NHS traps - it can be a hard instituation to penetrate - you migh to be more creative about how you get your research
Clare	Merritt	Grans house is static. Own home changes over time. Comfort. Changing spaces do we lose our memories. Dementia and memory loss. Nan cannot use a sewing machine any more: loss of memory/made memories. DBS check. Homes didn't want to let you in. Negative news reports. Red tape in place to stop research.	OK, you need a way to progress. How will you gain access. HOME COMFORTS: textiles and imagery. Nadine can gain access to spaces perhaps. Martin, contact with Health care professional. You just need to make the right contact. Focus on the textile aspect. You can link it to your nan, you just have to be careful about the emotional implications. Your nan is the place where you can get direct feedback! Then you can extrapolate, and see what is relevant for a wider set of users/translate it beyond your personal interaction.	If you weren't feeling demented before you would after you into a care hom Don't make assumptions It's really hard to work with this group - don't let it put you off Definition between dementia and old age - most 'well' care homes house p with dementia Be wanny to do this as part of the institution Janis Jeffries - textile journal Andrew Monk - work with dementia care home Helen Smith - head of mental healthcare for SE England
Nicholas	Lukes	Education system. TED talks. Alternative schools.SummerHill: free schooling/unschooling. Boarding schools. Outwardly confident.	Six Degrees of David Cameron. Not sure about working with dyslexic or dyspraxic people. If you aren't careful you're going to make the project undo-able. Problem where you try to focus in a place where you will fall intot he same traps: too large. Don't change the objectives. You can't change education. But you can build a programme? Go from the fictional to the super real. Design or define your objectives in order to play with it. Onkar Kular Elvis Impersonators: a 'silly' idea but, it became a training programme in schools!	TERRITORY: POLITICS, SCHOOL, ECONOMICS, PRIVILEDGE, LEARN DIFFICULTIES, SIX DEGREES OF SEPARATION Documentary following children from diff background '7 Up' to 56 Don't try to be too worthy, have fun. Six degrees of separation is a relaty tangible way into these subjects DO T FIRST Onkar Kular - Elvis education Dash Macdonald / Dash & Dom - training kids to be world leaders
Issy	Wright	Chaos. Concrete and bamboo. Detroit. Declining city nature is reclaiming. 500 years to blot out our achievements. Collapse of objects.	Nice films. Bauhuas blocks. Do more. NONO. That's not comparative. Be careful... Some of these are driven by terror. Some are the result of normal/natural disaster. These have different baggage. Neglected spaces. A Slown down, a terrorist attack, a natural disaster. Your films are nice. TAKE THIS FURTHER... The accidental. Take those experiments closer to your idea of decay. Do you create moments of balance: start to control the falldown. Nature acting. Self destroy in one day, one week, one month. LIFE AFTER PEOPLE= TV show/film. Famous statues: Lenin/Saddam Hussein.	You need to locate this. Social movements - like what? What is your main driver? Motivations behind deconstruction/collapse - regeneration? natural disater? Terrorism? Material experiments may help you drive this forward - keep this going eve you are not sure where it is going - it is useful to keep a material/process driven investigation alongside your conceptual development Constantin Brym - momentoes of tragic events
Rosie	Martin	Wood. Nature reconstruction. Resurgence of building in certain material. Chestnuts: how do we use/reuse them usefully. Heterotopia. Cemetaries, festivals and museums. Natural building techniques.	YOU HAVEN"T SPENT ENOUGH TIME!!! We eat them? You have to know what the building is for? The legalities and properties of the wood should drive this? Of course it doesn't fit! CONTEXT... Why is a round timber frame of any value or use?? You want to build using a specific technique, using specific materials. Lacka focus. When you look into a tradition, you need to work out what you are bringing to this? Are you borrowing the techniques? Bring something to the project which os not just you produce one of these woodland huts in the middle of London. Don't make assumptions about what is an eco building material? Plastic bags?? Materials are complicated. Timber = tied up with mortgages.	Local building materials - what are london building materials Legalities around law and planning Aesthetics Why is round timber framed building relevant? Don't make assumptions about what is eco You need to understand the complexity behind why or why not materials a used The reason we don't build with timber in the UK is because bancks won't le them Most things are ultimately controlled by banks or the state London brick - are these still produced in/from London? - speak to Martin Walters Way (Timber buildings, self builds)
Amy	While	Trail running bringing natural and mountain running into the city space Morgan Williams - ultrarunner, mapping ultrarun route onto london, stairs to imitate elevations, personal mental experience, not dicated by numbers	Juliet.	Mapping the catharsis of running / demapping / ultrarun Whats the opposite to the Garmin / mileage trackers / heart rate monitors / strada runs / GPS Getting lost in the city Nike app - collecting data about runners in Hyde park - fictionalising why someone would run just once This data is open - can you do something with this? Continue all the above - physical & nairvgational investigations ///Addition/// Hacking runners / he didn't actually do this but some interesting ideas here about what you could do if you could hack running apps to disrupt / manipu runners (all Londoners run with apps - it's the obsession with numbers thin http://www.davidchatting.com/runninglives/earhacking/ The project I told you about where running data was used to create fictions http://www.davidchatting.com/runninglives/263/ There's some other relevant stuff on Dave's site around mapping.

Figure 5. Goldsmiths BA Design, Third Year "Territories" Feedback, 2015

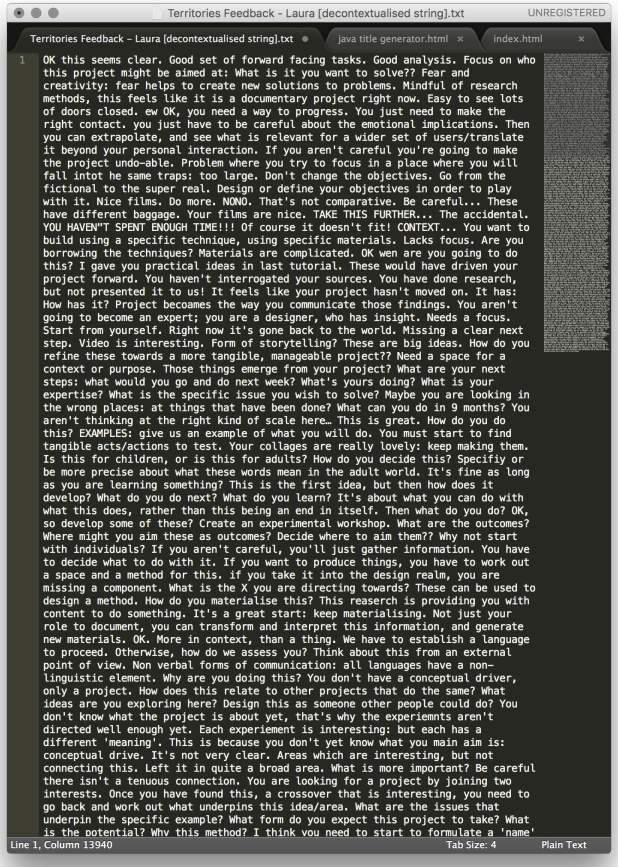


Figure 6. Laura Potter's "Territories" Feedback - Decontextualised String

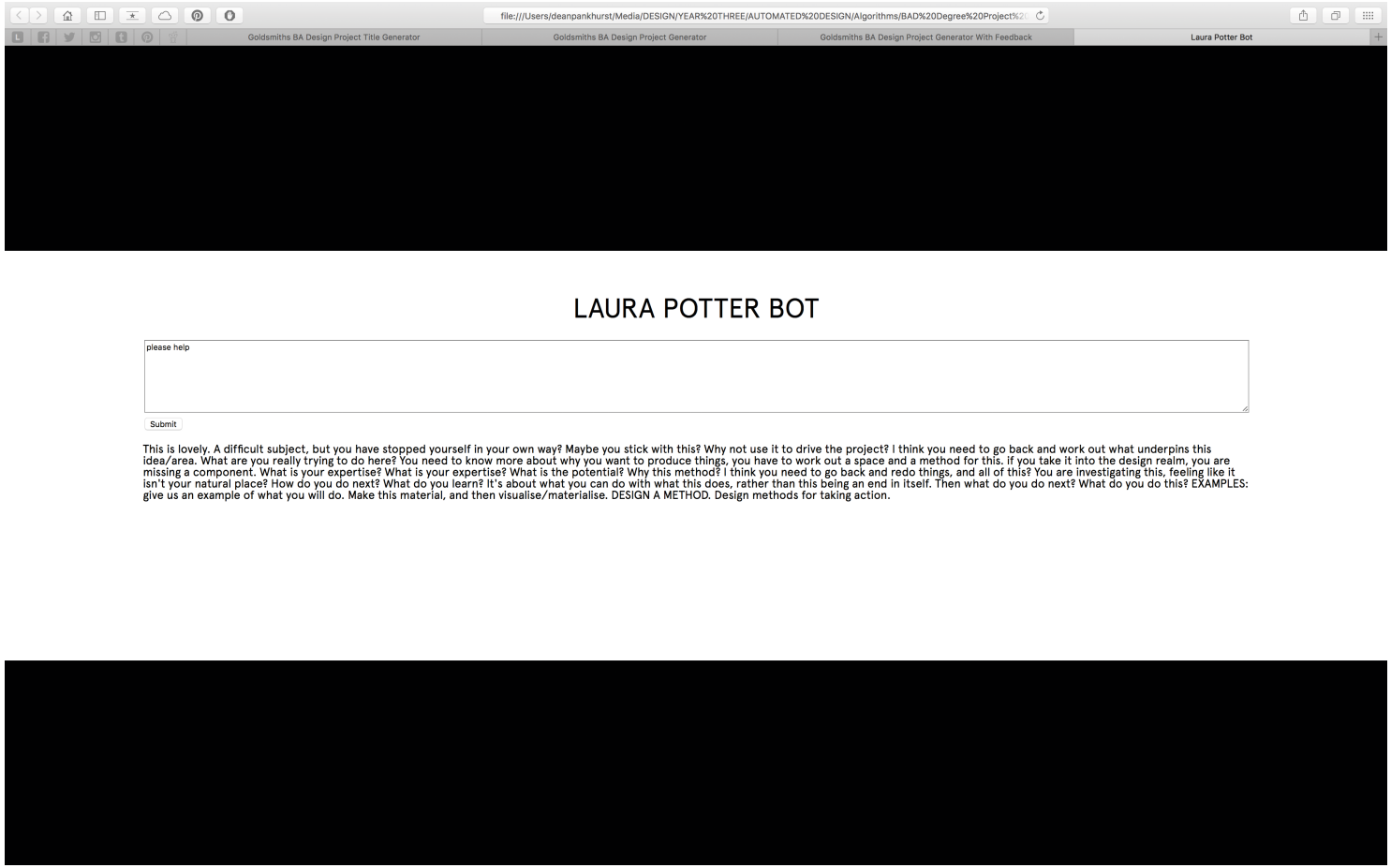


Figure 7. Laura Potter Bot, Algorithmic Tutoring Iteration - Web Based Interface

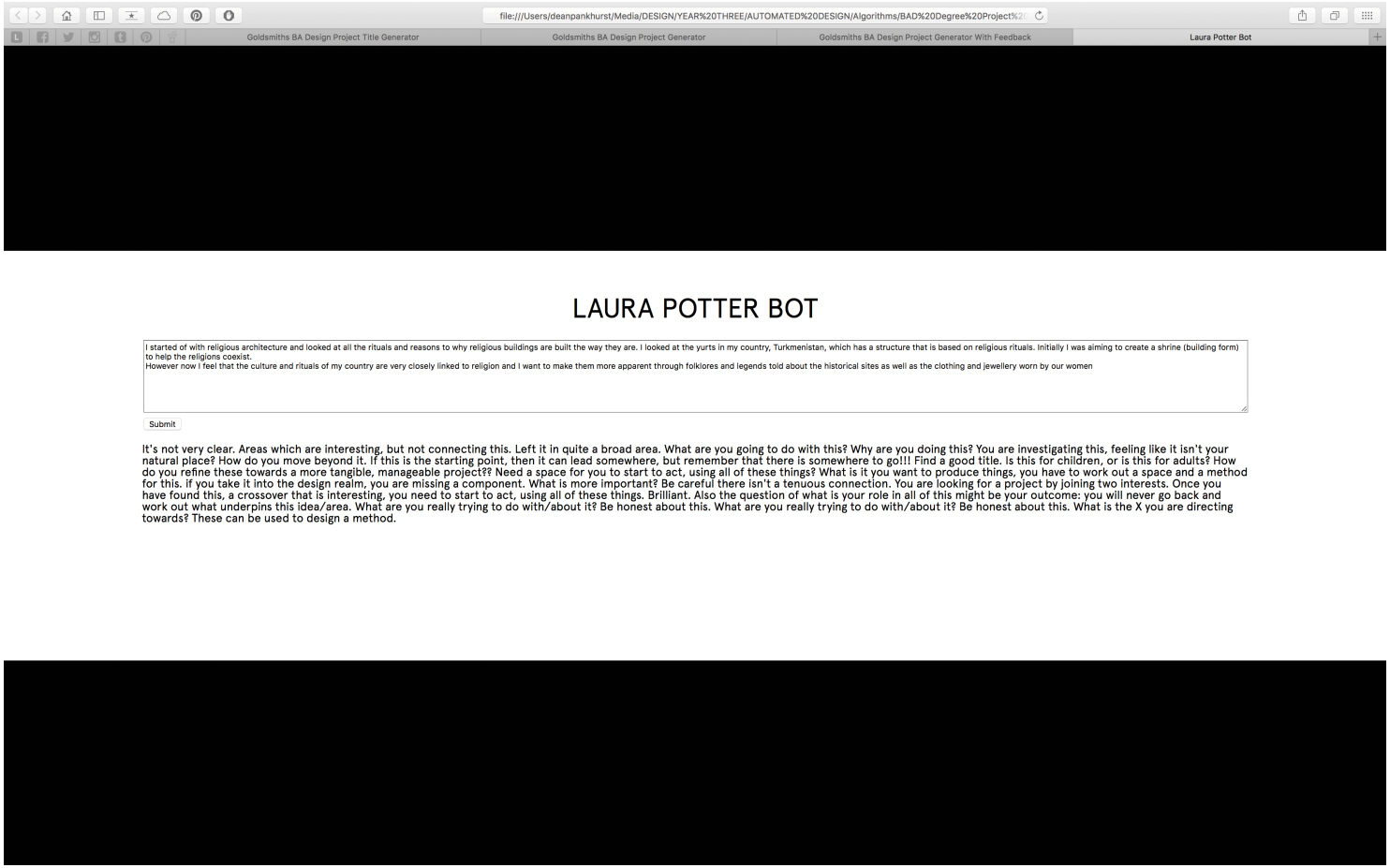


Figure 8. Laura Potter Bot, Algorithmic Tutoring Iteration - Input by Humay Meredova

THE [CULT]URE OF ACADEMIA

10.
Some notable examples are as follows:

Keith Tyson's "The Art Machine", which gives specifications for the construction of artworks,

"The Art-machine was a real computational mechanism; a set of algorithms, flowcharts and computer programs rather than a physical stand-alone machine like a sci-fi computer or a robot. It used random generators, existing grammatical structures and recursive networks to give instructions. I called each run through the system an "Art-Machine Iteration." [Tyson, 2015b][Figure 9.]

Matthew Plummer Fernandez' research into algorithms as a method of constructing, distorting and reconfiguring prior art and information,

"Everyday items such as detergent bottles and a watering can are 3D scanned using a digital camera and subjected to algorithms that distort, abstract and taint them into new primordial vessel forms. In some cases only close inspection reveals traces inherited from their physical predecessors." [Plummer Fernandez][Figure 10.]

Without disregarding the importance of multiple stages of learning and investigation beforehand, the third year of the course is naturally the culmination of the student's combined knowledge of how to approach a problem space by using design thinking and investigation. It is also assumed that at this point the student is fairly comfortable with their own design "tools". This, compounded with the final year being my current stage of progression, therefore presents the opportunity to experiment and ideate as I progress, and makes situating my research within my own third year project, as a kind of "meta-project", an alluring prospect.

One of the primary tasks when approaching the complex goal of automating "design" is to deconstruct what that actually means. When we pick apart the act of designing as a set of methodologies and actions, we begin to understand what constructs the materiality of a project.

Use of the word *project* here is contentious. The conversation around this notion is situated, among other places, within the context of design education. It pertains most clearly within my personal studio practice, to the Goldsmiths BA Design course itself. I believe that in order to compress and mould the "design process" into a structure that can be assessed and contained within a set time frame, the projects that are generated at this stage [in combination with the methods and processes that have been inherited from education and personal practice both before and within the course] are built using a somewhat common set of tools that are underscored by a more intangible "style" or "brand" that the course imprints onto projects that the student produces.

Furthermore, a good "project" is not necessarily homologous to good design in the "real world", especially in the field of speculative and critical design, due to a generally distinct purpose and method. A "project" in the context of education is a particular device with its own cultural and structural atmosphere.

These assumptions however require further examination, and therefore I have devised various investigative methodologies that attempt to come to a better understanding of these observations. These will be explained and contextualised in the broader sense in the following section.

Automating creativity, and in particular Art and Design materiality, has been attempted before in a variety of ways, and has its roots in early computing.[10] At this stage I am wary of diving head-first into process and resolved outcomes, and instead focus on the territories and concepts that underpin project content on the course. It is there I hope to find a good starting point for building a more complex set of constructive tools.

10. [continued]

Goldsmiths, University of London's "What-If Machine", which was used, in part to conceive a musical theatre production,

"The (What-If) Machine was created under a three year initiative, starting in 2013, to answer the question of whether creative software can move to the next level by generating, assessing, and presenting interesting ideas – whether it's stories, jokes, films or paintings - that are really valued by the people who are exposed to them." ... "Beyond the Fence is both conceived and substantially crafted by computer, modelled on a statistical study of the 'recipe for success' in hit musicals."
[Cox, 2015][Figure 11.]

Somewhat unconventionally, I decided to start at the end, and pick apart the degree show as a structural marker of completion, where conceptual communication is more heavily considered.

The use of language in the show as a device to explain project territories and concepts is useful to my own research here in a variety of ways, shared in part with the reasons for using language as a conversational medium in the previous section. Firstly it is common and standardised, in that each student in the show is bound by a text that is of a certain length, in English language, with a similar use of academic rigour and specificity. This standardisation makes it useful for direct comparisons of concept and subject. The second, with regards to comparing the use of language as a vehicle for description and summarisation, is that there are various tools and procedures that exist to derive understanding from it, both in a linguistic and analytical sense, as well as an algorithmic and computational one.[11]

My intention at this point was to investigate whether an algorithm could use this linguistic material as a way to deconstruct and reconstruct Goldsmiths design projects. Furthermore, to ascertain if this particular linguistic framework for design would be viable as a starting point for a machine that would produce design projects that are indistinguishable and yet sufficiently differentiated from what has come before, to stand alone as an original artefact. This would build on the spirit of "Conceptual Poetry", as a particular technique of assembling "original" ideas and particularly language, from a combination of prior art and wider reference points.[12]

11.
Traditionally Discourse analysis as an investigatory method tackles the relationship between the usage of language and its meaning. The field of text linguistics is also applicable here is the way that text is constructed, particularly in relation to the syntax of reassembled literature. Discourse analysis however aims to extract socio-psychological characteristics from language, which is the crux of this investigation.
[Cameron and Panovic, 2014]

12.
Goldsmith believes that the Internet, with its cataract of words, made obsolete the figure of the writer as an isolated man or woman endeavouring to produce an original work. Instead of depending mainly on his or her capacity for invention, the new writer transports information. He or she retypes and recasts, archives, assembles, and cuts and pastes, passing along pieces of writing and blocks of text, the way people do on social media' [Wilkinson, 2015]

Using their websites and catalogues, I compiled the titles and descriptions of every project exhibited in a Goldsmiths BA Design degree show from 2011- 2015. [*Figure 12.*] Beginning at first with project titles alone, I collapsed the entire database into a continuous string of words in a text file. By using a simple javascript random sentence generator, this database was able to be rearranged on the fly into new titles and displayed in a web-based user interface.[13] [*Figure 13.*]

What this produces is a somewhat unsettling collection of titles that seem simultaneously absurd and entirely plausible within the context of the course. Primarily because they are constructed from the course, but also because it is fairly easy to project our own imagined response to what the body of that project would look like, based on its title alone. The fact that designers in this institution are so easily able to do such a thing must signify the presence of an "academic shorthand" that I am interested in interrogating.[14] [*Figure 14.*]

13.
Accessible at: http://www.badprojectgenerator.deanpankhurst.co.uk [Pankhurst, 2015b]

14.
At this stage I have only conducted this experiment with Goldsmiths BA Design. As the project progresses I intend to compare the "academic shorthand" of several Art and Design higher education institutions in the UK, in addition to how this changes over variable time frames, as a subsidiary research tangent.

These thematic tropes appear most clearly here because the choice of title is the most tightly compressed summary of the territories, politics and ideologies that the project appears to be embodying. Naturally by unpicking and reweaving the fabric of the institution's output, the machine is self perpetuating, satisfying in the most basic sense what seems to be an intangible byproduct of the particular design sensibilities that this course promotes.

Here it has a name:
So Fucking Goldsmiths

This term was released into public consciousness by Design students at Goldsmiths around 2007 with a series of branded artefacts and events. [*Figure 17.*] It has since been adopted as an often self-depreciating term which has broadly come to describe a unique blend of underlying institutionalised tropes that are associated with Goldsmiths university, often in a political or sociological sense. In relation to BA Design in particular it is probably indicative of a variety of things. On a personal level I believe they range from well trodden territories [such as architectures, education and politics], "socially engaged" projects, recurring references to particular theories, and even a particular kind of humour or playfulness that appears in a range of works, overarched with an interdisciplinary and critical approach. All of these elements combine to create a kind of academic identity which could be otherwise described as an "aura". [15] Critically this term is fluid and represents varying things to a range of people, shifting over time.

15.
Walter Benjamin uses this term in "The Work of Art in the Age of Mechanical Reproduction" to describe the unique existence of an original artifice. Although his usage is different to the context of my own, it does however tackle the detachment of reproduced art from tradition [Benjamin, 1999, p. 215].

If we reframe the construction of a "project" in its entirety to that of an extended and particular artifice, the designer at work, by lending their hand to the construction of such a body of combined research and production becomes akin to that of the classical artist. In reproducing this artifice the algorithm will invariably 'emancipate the work of art from its parasitic dependence on ritual' as Benjamin suggests [Benjamin, 1999, p. 218]. It remains to be seen if this "ritual" is a product of, or requirement for, successful project submissions in design education.

The academic identity expressed here is likely a combination of feedback loops which recur in many cultural spaces. I find it particularly interesting the volume of alumni from Goldsmiths who return to teach, as well as the course's close relationship to the Royal College of Art. Many current students see graduate's work in degree shows which have particularly strong identities, and it is assumed to be "the way things are done". While many would agree [including myself] that this is a positive thing and reinforces a strong ethos of critical interrogation and various other elements that Goldsmiths Design is renowned for, I would also argue that this could lead to a kind of ossification that threatens the growth of critical discourse and may, by extension, leave those students who do not adhere to the same aesthetic and conceptual values to be left by the wayside. To be "so fucking goldsmiths" is also frustratingly inescapable and many have regarded this current project and approach which I am undertaking to be an unmistakable embodiment of the trope, but I digress...

We are left with the question of whether it is possible to reproduce such an "aura", or whether this is even required for a successful project [to ask if it is required of successful design is a separate question]. One could argue that the presence is in the reading of the artifice, and if this is true, situating the project in proven successful territories of past works, as the title generator does, may help to convince the reader of such a presence. For me it lies somewhere in between the presentation and interpretation of reality, and in that regard, if the algorithm's intention is to fool the reader, it must pass a kind of "Design Turing Test" [16] which is a question for another time.

15. [continued]

It is later in the essay that Benjamin constructs the metaphor or the magician and the surgeon. Comparing the magician to the painter: maintaining a natural distance from reality, the painter constructs an image with totality that maintains an "aura". In contrast the cameraman becomes the surgeon: penetrating deeply into the body, assembling multiple fragments of reality under new laws, the final image appearing free of all equipment, [Benjamin, 1999, p. 226,227].

In this metaphorical situation
the designer becomes the magician, and
the algorithmic designer becomes the surgeon.

If the analogy of the Magician and the Surgeon ring true then these experiments become exercises in establishing and testing the reconstructive lenses of the Surgeon, on the body of design practice.

16.
Alan Turing's early investigations into what came to be known as artificial intelligence, included tests to determine if a computer's actions could be interpreted as indistinguishable from Human action. [Turing, 1950, p. 434]

Stevan Harnad notes that what Turing was actually asking was, 'not whether or not machines can think, but whether or not machines can do what thinkers like us can do -- and if so, how.' [Harnad, 2004, p. 1]
The distinction between thinking like a Human and performing like one is important. The Automated Design Algorithm is therefore required only to be performative and is not constrained by the traditional thinking processes of the designer.

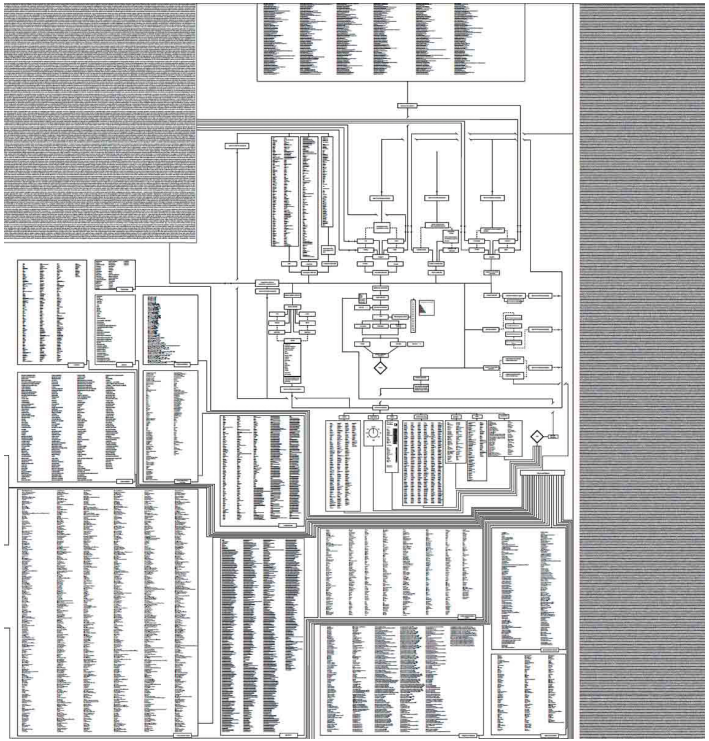


Figure 9. 'Flowchart Showing The Art-Machine's 2 Dimensional CPU In Its Centre', [Tyson, 2015]

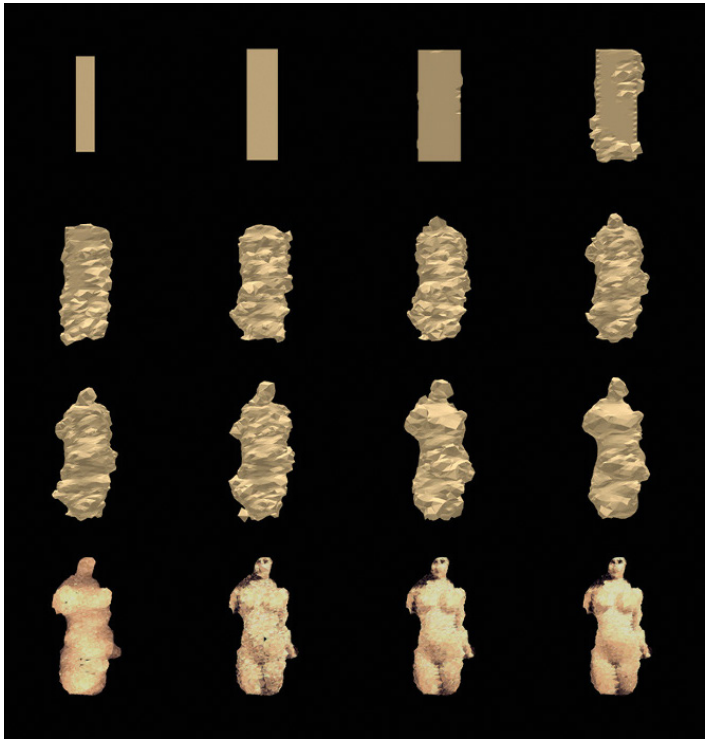


Figure 10. Venus of Google, [Plummer Fernandez, 2013]

Figure 11. Still from "Beyond The Fence" Trailer, [Wingspan Productions, 2015]

a photographic memory sonic sketch the shape of wind insecurities dirty money ownership of the face the spectator enhancement the gay agenda reclaiming culture ditto phantom ink stained verses geobiography give data protein politics draw-it-yourself truth and beauty conspicuous production labels integrate to aberrate figure of speak what are you looking at? virtually real prison fiction edible package little bit of everything daydreams robots against routine how good are you now? proximity produce mystery light and shadow transforming the threshold better read precious waste mining for emotion emergence of subcultures the glorification of the mundane post-death (a survival process) the cinematic suite number 4 posing power the amateur plan pushing the envelope -ve space the idea of nature networked performance of the protest “they make it look so easy” zzz but the very hairs of your head are numbered machine 24 de-industrialising confectionary let‘s fill this town with waste ambient intimacy digital dining urban escapes grandma‘s jumper-distilled nostalgia gamified growthism inner city innings everydayism the human touch kiss. the phone cupid being barbie exquisite thoughts live legacy fruit appeals drawing mills breaking point glocal / global design for local production fairly forged uk the inefficient insurgent born to be famous micro-rituals do you like to be beside the seaside super cows framing histories play-eat excercise-eat cook-eat emotive data the third layer unlocking ‘sentimental objects’ the arcane sanctuary the evolution of gesture trafferball: a sport extracted from rioting the ten year old things fall apart stop dont look just listen... performative design as a tool to interrogate social phenomena in plane sight domestic tourism do you ever think that you are living in a ‘fantasy world’ ? the adventures of a well-being superhero designing nostalgia fleeing monotomy: making the world a bigger place how can i help ? non-ideal super fun cities famously anonymous the end of time digital heirlooms death formula custom story time the secular congregation non-organisation unfold evaluate and solve from problem packaging to problem solving prepare. accept. archive. twin entanglement comment is free escapism - the disneyfication of a city railway resurrection minimal input - maximum output fictional histories sonic kicks new energy investment domestic science machines tasty trickery tribalisation urban wilderness the discourse on intercourse city hall libra rising mind mirror giving for happiness an introverts transformation to extroversion achievements in wasted time the school of etiquette through the [big] screen vertical geography the welsh space campaign see what i mean the kawais online the tea manifesto memory palace touch revulsion crowd sourced disclosures cyclic power natures: fuel cell ecologies storyplay plan b dependent nature the image and its echo exploring the world of paper hyperfilm brave new womb tube yoga club stay posted keep going everyday objects vs mobile apps hello i am a nanodesigner city gaits cryonic reanimation ready for take-off tree factory matbot the honest guide to cooking brand new second hand pinissue: social transitional architecture the objective observer future forgetting pixel rain memory & technology: interwoven forgetfulness healing soviet trauma the distributed museum the social mining union longevity brandalism the hyperreal hotel we are the 11.2% hijacking education skip plastic and the city: a temporary urban occupation discrete acts of emancipation the untranslatable city the intertidal cinema untitled being safe and super the mandelbrot project a moment for light io architecture happy endings & unrealistic expectations de-touring training programme for life at 4 degrees warmer strategic gift investments commercial cannibalism the body time machine biodesign unconfusing print the consumerist pursuit of happiness objects of violence heel our soles discovering the anthropocene city swarms the unplanned city medical object-ive anti sat-nav solution for urban adventure this is not supposed to be here the secret language of food isope denim sub_topia: deployable work spaces the civic football league architected anticipation

Figure 12. Goldsmiths BA Design, Degree Show Titles, 2011-2015

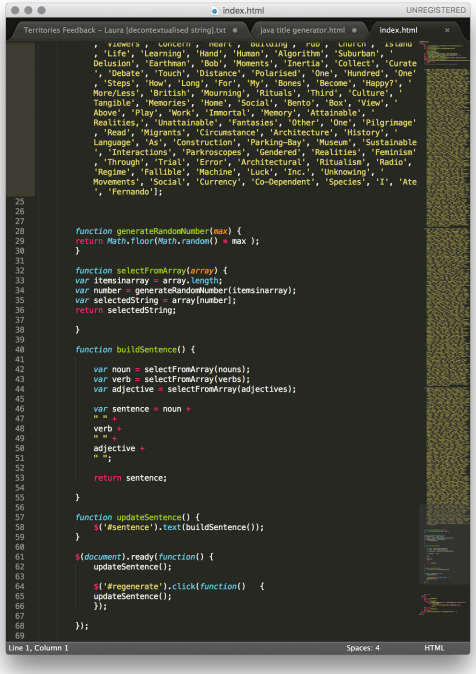


Figure 13. Goldsmiths BA Design, Degree Show Title Generator - HTML Code

Figure 14. Goldsmiths BA Design, Degree Show Title Generator - Web Based Interface

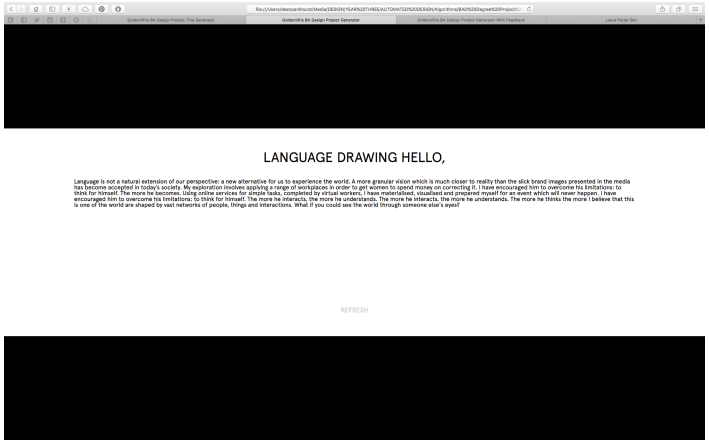


Figure 15. Goldsmiths BA Design, Degree Show Title and Description Generator - Web Based Interface

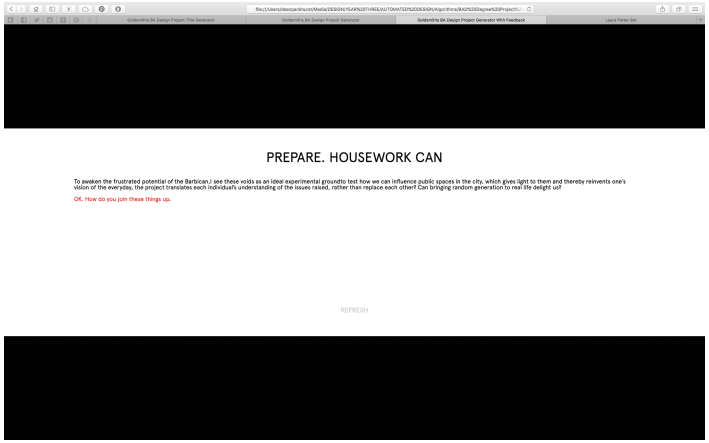


Figure 16. Goldsmiths Ba Design, Degree Show Title and Description Generator, integrated with instant feedback from Laura Potter Bot - Web Based Interface

Figure 17. "So Fucking Goldsmiths" T-Shirt

AUTOMATING DESIGN PROCESS

I consider the title generator which I presented earlier to be an act of distillation, it compresses prior art into its most simple constituent parts and reconfigures those parts, offering the opportunity to decompress them into something different, but ultimately familiar. In order to test this decompression and the concept of an "academic shorthand" I began to run workshops with third year Goldsmiths BA Design students.

The investigation of discursive patterns within an institution is a powerful way to gain insight into how the culture, or indeed a multitude of cultures extend beyond the traditionally valued understandings of the beliefs and practice of the researcher. Several variations of discursive investigation exist, my own practice is informed by the work of Gilbert and Mulkay, documented in "Opening Pandora's box: A sociological analysis of scientists' discourse", [Gilbert and Mulkay, 1984]. I am in a good position currently, to perform this kind of investigation as an existing participant of the observed institution, this insight may however be traded for objectivity.

In this scenario I gave each student the option of working alone or in groups, then proceeded to hand them the BA Design Project Title Generator, which would deliver a title each to expand upon. I stipulated two deliverables: a body of work produced throughout the day which is unconstrained in its scope and method, naturally exhibiting research, idea generation, process, and resolved outcomes. Secondly, a one-hundred word mini context report, which situates the project contextually, and also acts as a language-based descriptor. At the end of the day all of the projects are exhibited in a "micro degree show" setting [which is somewhat of a novelty]. [17] [*Figure 18*.]

The intention of this experiment was to use the students as human surrogates inside an imagined algorithmic system, to prototype how such a system would behave, and what methods it would employ to produce materiality.

I was expecting to document this activity by breaking down what each participant did and understanding those actions as a set of processes that a machine could replicate, hoping that by laying bare the participants' natural processes I would be able to create a kind of 'designers toolkit'. Sometimes sketching would be appropriate, maybe collage or electronic coding. Although this documentation is still the primary goal of the experiment [and these become extrapolation points for the continuation of my own project], there are additional observations of underlying behaviours to be made.

17.
Documentation of this workshop is assembled in the form of a booklet. [Pankhurst, 2015a]

By shrinking a dissertation project into a day, there is an inherent reduction and compression of process.

The students seemed confident enough with their own design techniques that they could be used fluently. This refined and targeted methodology is in many ways already automated.[18] We know what does and doesn't work for us and our practice, and we know which design tools are the most appropriate for the task at hand. It is in this regard that I am revealing the ways that design students, and by extension creative practitioners in general, in their practice, exhibit recurring techniques of optimisation and streamlining that are more clearly observed in industry and business.

Therefore it doesn't seem so far fetched to further investigate this streamlining by itemising those processes and ascertaining when and where they are most appropriate, and if an algorithm had every one of those tools at its disposal, how would it justify their use. Furthermore, if those tools could be tailored to each student's individual experience and technique, it may be possible to essentially automate and supplement specific responses, in the same vein as the "Laura Potter Bot" which I explained earlier.

18.
It is my assumption that these exercises in creative efficiency are likely sub-conscious decisions and occur as a result of a combination of many factors, including but not limited to:
a personal status-quo or "brand", taught techniques that are favoured by the marking criteria, time saving strategies, "common ground" skills shared between a group, etc.

In this particular workshop, Clare Thompson utilised collage as a medium to visualise the concept for her group's outcome. [Figure 19.] This is a technique which is familiar to her and is able to be deployed in a reliable and predictably successful way. This underlying reasoning is also reflected in the use of the Javascript coding language, Processing and Arduino ecosystems in my own response to the workshop. [Figure 21.]

Figure 18. Algorithmic Design Workshop No.1 - Micro Degree Show

Figure 19. Algorithmic Design Workshop No.1 - Collage, Clare Thompson and Tom Wagstaff

Figure 20. Algorithmic Design Workshop No.1 - Model, Clare Thompson and Tom Wagstaff

Figure 21. Algorithmic Design Workshop No.1 - Lie Detector, Dean Pankhurst

CONCLUSION

I propose that the hypothetical objective, and indeed use, of the automated design education machine [as a range of tools], is to capitalise on these optimisations, firstly to acknowledge this as phenomenon, and critically, to take ownership and agency in how and when these optimisations are delivered.

The implications and possible benefits are varied. It could for example, in an institution which is restrictive in its teaching and assessment structure, prevent such circumstances from limiting the scope or otherwise warping design processes that students would otherwise desire to pursue, to in some part separate the conscious from the unconscious. It is this separation of design practice to fulfil criteria from disparate sources that the act of design automation may support. In this particular scenario, to simply allow a student to pass the course, whilst simultaneously channelling a design methodology that they have full agency over, in a separate and unrestricted space, without disregarding the teachings that the former has to offer.

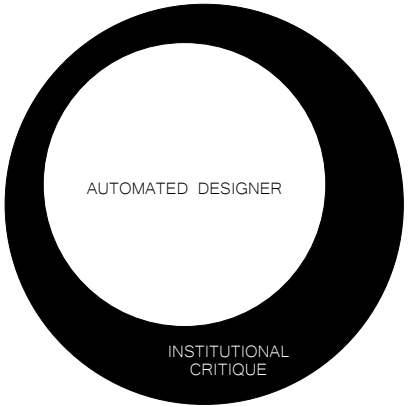
Furthermore, if we are to acknowledge that it has become a strategy for many students to expect a return on their investment in higher education, this automating tool may provide them the opportunity to pursue paid work, so that they may fund their qualification, or indeed do anything else in the spare time that the machine provides.

This framework is, of course, not without issue. If design is to create the new [Marenko and Brassett, 2015, p. 21], then using the past as a basis for future insights may be reductive, in the case of the BA Design Project Title Generator, any new production is confined, at worst to what has already been, and at best a limited scope of re-workings of the past. It is in this sense, what could be regarded as a fundamental principle of critical design, and indeed the objective of the course, is lost in the output of the machine, yet its ability to satisfy the marking criteria and achieve academic success is still present. The subsequent challenge becomes evolving the algorithms into constructive devices, as apposed to reductive ones, retaining the possibility of using prior material as a foundation or framework for production.

If we consider the traditional view of design to be a tool for problem solving, as is explained by Betti Marenko,

'On the one hand, design as a problem solving is task-oriented, performance-measured, linear exercise that reduces uncertainty. It is based on a conventional view of design as a technology of affective capture that enforces and reproduces market ideologies (Marenko, 2010). On the other hand, design as a problem finding activity has to do with an increase in complexity, a problematisation of the existent, and a development of a material sensitivity via design.' [Marenko, 2015, p. 119]

Then the automation of a task is exactly that, it brings with it inherent reduction and compression of the problem space in order to accomplish this task. Conversely, to find problems or pose questions, as critical design is concerned with, is to embrace complexity. These two approaches are opposed.



However, when we frame the project as a whole to be an encapsulation of this process within another process, we might again consider the whole affair to be critically valuable in a way that its function as a tool is not. If we take a step back and view this as a meta-project that informs wider discourse, the project as a whole, including this report, becomes a way of using the reductive techniques and market ideologies of automation by repurposing those problematic tools as methods of research and modern design thinking within the wider framework of design education, practice, and theory. In their use, and by constructing visions of their permeation, complex insight and critique is formed. [*Figure 22. Left*]

It is important to acknowledge at all times that this exercise is not suggesting that automating design education is a categorically *good* thing to do, but moreover a good experiment to undertake.

To summarise, this report has been a situation of my own methodology, informed by the techniques of a diverse range of practitioners in various fields, into the wide contextual territories of higher education, technology, industry, and academia.

It has been a documentation of investigation primarily limited to the practice and culture of Goldsmiths University's BA Design course. Moving forward, the value in applying such an investigatory lens to additional levels of education, and indeed other institutions, is clear. In doing so I may be able to point my research outwards and expand the scope of the project as a whole. As a work in progress, a solid foundation and purpose has been established to continue into additional areas and to insightful conclusions.

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