

becoming **designers**

education & influence



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edited by **Esther Dudley & Stuart Mealing**

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preface

Esther Dudley & Stuart Mealing

The world is changing and the role of the designer is changing with it. As consumers in a twenty-first century western society we have little choice but to collude with its information-driven materialism. As academics we (the editors) research, discuss and disseminate ideas about the ongoing place of design in such a world and, in doing so, have discovered a paucity of books dealing with the subject. As educators, however, it is not enough to merely hover at the fringe of the world of design, we should be at its heart and with *Becoming Designers* we aim to contribute to a timely, and at times provocative, debate.

This work therefore, seeks to offer a context within which to understand the educational needs and aspirations of today's designer. It considers crucial issues of new technology, gender, ethics, globalisation and internationalism as well as more focused topics related to the teaching of design practice and theory and to the appropriateness of current methodologies for doing so. To this end our contributors are an eclectic assembly variously combining the roles of designer, teacher, researcher, writer, sociologist, philosopher and public speaker. They have extensive experience of, and varied perspectives on, the world of design and, most importantly, all hold strong convictions. We are delighted that, despite their hectic schedules, they have proved united in their willingness to find the time to write these chapters.

The arguments presented, as one would expect, are as diverse as the authors and the opinions expressed are not necessarily shared by either the editors or by other contributors - indeed the grounds for heated arguments lie within these pages (we hope). The styles of presentation also vary and by limiting our attempts to unify them we have sought to preserve the individuality of each writer's voice.

Currently a mood of reflection about the role of the designer has settled upon the design world. The influential manifesto *First things first* published by Ken Garland and signatories in 1964 was revisited last year and has resulted in the publication of *First things first 2000*. Uppermost in the minds of the supporters of this revised manifesto are the social responsibilities put upon them as responsible designers. Clearly this signals a profession in a state of introspective flux as argument and counter-argument ring out around design studios (and public houses).

Issues raised in this book will be of interest to practitioners, academics and students alike and hopefully comment from all these quarters will fuel fresh writing. Indeed at a time when names such as Brody, Dyson and Lambie-Nairn are common currency beyond the world of design and governments extol the value to the economy of design, the book might engage a wider audience.

udzk – designing the design student

Stuart Mealing

Stuart Mealing is a reader in 'Computers and Drawing' at the Exeter School of Art & Design (University of Plymouth), a founder member of their Centre for Visual Computing and teaches in the graphic design department. Trained initially in Fine Art, he exhibited widely and taught in art colleges for many years whilst maintaining an interest in the development of computing and artificial intelligence. He later took a post-graduate degree in Computing in Design and since then has been an Honorary Research Fellow in Computer Science at Exeter University, a founding co-editor of Digital Creativity, has published four other books and his papers have appeared in a range of journals.

With genetic engineering imminent it is tempting to prepare a recipe for the ideal design student. To define the sequences of nucleotide bases in the chromosomal DNA and the conditions of maturation that will, in about 18 years, produce ud2k – the perfect undergraduate designer for the new millennium. A Frankenstein wunderkind built to conceive, create, devise, discover, draft, draw, fabricate, figure, formulate, hatch, invent, mastermind, meditate, model, originate, plot, scheme, style and weave. In short, to design.

This chapter will consider what might be the desirable manifestations of these imaginary biological tinkering as evidenced by the skills and traits of the monster itself, i.e. what makes a good design student. These qualities will also be considered in the context of tendencies within the university system (in the UK) that is invested with the task of converting this raw material into worthwhile practitioners. Is 'BA (Design)' the ultimate hallmark of a good new designer or might the academisation of design, in order that it can be 'read' as a legitimate subject alongside Law and Classics, have deflected the discipline's natural apprentices?

Any wish-list of key attributes is to be modified, not only in response to the changing needs of design in the real world, but also to the educational structure within which training takes place. It is implicit in the process of selecting students for design courses that there are qualities and standards that are sought by receiving institutions, though these are more likely to be tacitly understood than precisely defined. I suspect that staff conducting interviews across the country would reach a high level of agreement over which applicants are the best and which the worst but there perhaps would be less agreement on a prioritised list of the characteristics they believe aspiring designers should possess. Try placing in order of importance: drawing skills, intelligence, creativity, determination and literacy and state which, if any, are dispensable.

Creativity

Creativity knows no bounds. Its forms are legion, its sources obscure, its ways devious in the extreme, but its fruits are patent for all to see in every domain of human life.⁹

It is hard to imagine a good designer who is not creative but perhaps in a design team there is room for people with a range of talents and their roles may not require the demonstration of 'classical' creativity. I have on my shelves a book with a title that appears, at first glance, from the smug viewpoint of one trained as an artist, to be a classic oxymoron – Creative Accounting. You can be creative within other terms of reference. To apply creativity effectively, however, it needs to be coupled with other things. In studies of leading artists and scientists Anne Roe²³ found that the only trait that stood out in common among individuals was a

willingness to work hard and to work long hours. Whilst this is a trait that is likely to contribute to success in many fields, her observation threatens the uninformed impression of casual creativity offering an easy alternative to hard work. Thomas Edison is often quoted as saying that genius is 99% perspiration and 1% inspiration.

The characteristics of the creative act have been widely discussed and there is general agreement in the field that a mixture of rational and intuitive processes are involved and that the result displays originality. It is tempting to think of creativity as not being domain specific, to think that a creative free-thinker could have original ideas in any domain – (original AND useful of course, since to be original one merely has to be wrong when everyone else is right) – but originality is often a re-combination of elements into new patterns, which implies that the elements must be present and that therefore a basis of knowledge in a field is necessary to permit original thinking in that field.²² It is necessary to study design in order to come up with original design solutions. Indeed most researchers suggest an incubation period for the creative act primed by thorough immersion in the subject area – ‘saturate yourself through and through with your subject... and wait’.²¹ Pasteur’s famous dictum ‘in the field of (scientific) observation chance favours those who are prepared’ expresses a similar thought.

Interestingly, however, it is often the newcomer to a field who displays the greatest originality, as the more often an individual has solved problems with given ingredients the greater is the ‘set’ and the less the likelihood of attaining a further creative solution using them again. Our designer must apparently be both knowledgeable about the area and yet new to it. Hopefully for those with many years’ experience, newness can be equated with seeing the familiar afresh.

Educating the creative

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- 9 Research has consistently suggested that general education does not reward or nurture the creative, Rogers²⁴ for example saying that in education we tend to turn out conformists whose education is ‘completed’ rather than freely creative and original thinkers. Perhaps creative behaviour, typified by wild or silly ideas, humour and playfulness, is inconvenient in the orderly world of traditional classroom education. Conformity – ‘sit still’, ‘be quiet’ – is inimical to creativity.¹⁹

In a study asking social science teachers to rate the importance of cognition, memory, convergent behaviour, divergent thinking and evaluation in their subject,²⁶ convergent behaviour was consistently rated far higher than divergent thinking; nearly twenty times as highly in some areas. I suspect this still holds true across most subjects (and it is pointed out that convergent behaviour is more ‘convenient’ for the teacher). Other research from the same source showed that the learning procedures of highly creative children are quite different from those

of children with high IQs but without high creative thinking abilities and that the highly intelligent children were described by their teachers as more desirable pupils, more intimately known, more ambitious and more hardworking or studious. Although these studies are now some years old, they still beg useful questions about the relative value placed on creativity in schools and on the level of reinforcement that creative behaviour is likely to receive.

Torrance²⁶ describes a student who displayed some of the most inventive, original and flexible behaviour found in testing several thousand children. His IQ (using the Stanford-Binet tests) was very high at 135 yet he was one of his school's most serious problems. He was not learning to read, had become a behaviour problem and frequently became so preoccupied with his thoughts that he didn't know what was going on in class. He faced a struggle between maintaining or sacrificing his creativity and the resulting problems of uncertain self-concepts, learning difficulties, delinquency and moments of schizophrenic-like withdrawal.

One of the first things that Rudolf Arnheim² established in his classic book *Visual Thinking* is that the educational system is based on the study of words and numbers.

In kindergarten, to be sure, our youngsters learn by seeing and handling handsome shapes, and invent their own shapes on paper or in clay by thinking through perceiving. But with the first grade of elementary school the senses begin to lose educational status. More and more the arts are considered as a training in agreeable skills, as entertainment and mental release. As the ruling disciplines stress more rigorously the study of words and numbers, their kinship with the arts is increasingly obscured, and the arts are reduced to a desirable supplement; fewer and fewer hours of the week can be spared from the study of the subjects that, in everybody's opinion, truly matter. By the time the competition for college placement becomes acute, it is a rare high school that insists on reserving for the arts the time needed to make their practice at all fruitful. Rarer still is the institution at which a concern with the arts is consciously justified by the realisation that they contribute indispensably to the development of a reasoning and imaginative human being. ... The arts are neglected because they are based on perception, and perception is distend because it is not assumed to involve thought.

The applicant designer knocking at the door of a 'respectable' university may well, therefore, fail to match its broad notion of ideal entrant criteria. The creative adult was not usually an outstanding student at school²³ but satisfactory examination results are likely to be a pre-requisite of acceptance. If a course is to be filled from applicants who fit a standardised profile and are rich in examination certificates – certificates gained in a system which does not reward creativity – one can only conclude that many creative people are likely to be

excluded. Experienced staff are able to make ‘imaginative’ selections for their annual intake but may have to fight for the right to do so in a culture where the applicants for most subjects apply on the basis of their expected examination grades alone. The knowledge of these criteria can also be expected to have deterred many potential applicants.

Intelligence

It has been observed that those with low intelligence are rarely creative and that the highly creative are usually highly intelligent but also that intelligence is no guarantee of creativity. Intelligence, it seems, is a complex set of inter-related aptitudes and abilities, some verging closely on the temperamental³ and creativity too appears to lie as much in the temperamental-motivational field as in the cognitive.⁶

I’m sure all teachers feel that they can intuitively tell a clever student from a stupid one and amongst the qualities that amalgamate to make someone ‘clever’ (skilful, talented, quick to understand and learn, adroit, dextrous, ingenious, cunning) is intelligence – a key ingredient of successful, creative problem-solving. It can, however, clearly exist without the validation of examination attainment; indeed academic intelligence is of limited practical use without common sense and intuition in its application.

Although it might be convenient to be able to assess intelligence, IQ testing has become contentious and is subject to a range of criticisms about what it actually tests, now widely being considered to be biased towards mathematical and language skills and even to institutionalise racism. A useful part of the raging IQ debate has been the definition of categories of intelligence, Sternberg²⁵ suggesting: analytical, creative and practical, measured respectively by: traditional IQ tests, by problems such as devising an advertisement for a new type of bow tie and by response to real-life hypothetical situations that might arise at work. This offers a more useful perspective on applicants to a discipline in which, it could be argued, little is usefully tested by formal examinations.

Gender

Intelligence, whether measured or intuited, seems a necessary prerequisite for a designer but at the start of the 20th century women were still considered too weak-minded to be academically educated... It was believed that young women would fall prey to neurasthenia or some other nervous disease if they strained their heads with intellectual challenge.²⁰

I do not propose to suggest that either sex makes a better designer; neither do I intend to enter the ongoing debate²⁸ about whether sexual differences are the

result of nature or nurture. I do, however, think it is useful to air the different aptitudes, sensibilities and perspectives that men and women are variously credited with, not in any sense of competition but in recognition of their alternative values. The dolls versus guns argument can still be applied to career decisions and few would be surprised to learn that surveys have shown all bricklayers to be men but only 18% of librarians¹⁵ or that boys are more likely to study engineering and girls to study languages.

Creativity, by its very nature, requires both sensitivity and independence. Torrance²⁶ says that 'in our culture, sensitivity is definitely a feminine virtue, while independence is a masculine value. Thus, we may expect the highly creative boy to appear more effeminate than his peers and the highly creative girl more masculine than hers'. Test results, for example, using the Terman-Miles masculinity/ femininity scale show college athletes with the highest masculinity score (+92) above engineers (+77) and above teachers (+45) with artists at 0 and homosexuals at -20.

Anne and Bill Moir²⁰ suggest that girls talk to their toys and boys deconstruct them; that girls tend towards verbal, co-operative games that exercise personal skills whilst boys engage in noisy, competitive games that test one another; that girls have a 20 minute attention span at a time when that of boys is five minutes; that in class girls pay attention and boys fidget; she is good with words and he is good with things. Sociable/competitive, quiet/noisy, compliant/argumentative, in agreement/ in disagreement. The Moirs are led to conclude that:

males and females are drawn by the biases of their brains to learn in different ways and to have different interests and enthusiasms, and any educational system that insists that boys and girls are the same, and must therefore be treated the same, is set to do damage.

By the time higher education is entered upon, a potential designer has had 18 or more years in which sharp differences in gender trait are likely to have been smoothed by peer contact and social mores. Differences are less polarised but the underlying trends are still there. There are 13 mathematically gifted males for every one female;¹⁸ women have larger colour vocabularies, better verbal memory and better performance on a test of finger dexterity;¹⁴ men are more impulsive, impatient and more easily bored; women have better verbal skills but men have better spatial skills and hand-eye co-ordination (the old chestnuts about parking and catching) though women are shown to be better on spatial tests during the low oestrogen phase of menstrual cycle and better at fine manual skills in the high oestrogen phase.²⁰ One of the more interesting of the Moirs's observations is that women's brains cross reference more efficiently whilst men's focus better; a contrast between floodlight and spotlight.²⁰

All these characteristics suggest differences in the way an individual will operate in a design environment. The choice of skills acquired and aptitude for them, the relationship with others in a design team, the problem solving methodologies employed, the briefs accepted (where choice exists), all are potentially influenced by gender traits. A design team (or design course) will have a greater range of skills and perspectives at its disposal if the aptitudes and traits of its members are spread across the gender-typical scale. This need not, however, be the same thing as equal numbers of both sexes if we note again that artists are shown to have a neutral score on a masculinity/femininity test and if we consider designers as being similar, in a meaningful way, to artists.

Art or science

Forty years ago in his Rede lecture C P Snow famously came up with the idea that art and science are two very different, implicitly irreconcilable cultures. F R Leavis and others have presented reasoned rebuttals of Snow's 'laughable melange of elementary error'¹ but the idea persists. Whether or not the two can be considered different cultures they are widely caricatured as being at opposite poles of an axis stretching from hard, rigorous and masculine at one end to soft, imprecise and feminine at the other. There are no prizes for guessing which pole represents which discipline – art is supposedly fun and easy, science is serious and difficult. Having spent blocks of time variously life drawing and coding in C++, I resist any argument that either, taken seriously, is either easy or uncreative or does not present an intellectual challenge.

But if one were to accept such a continuum, where along its length might design be intuitively placed? Somewhere between the two extremes, with illustration close to the fluffy, artistic end and industrial design closer to the tough, engineering end – and within illustration, the technical distanced from the editorial, within industrial design aerodynamics separated from styling? Design disciplines seem to embody elements associated with each of the two poles but rarely exclusively or in extremis. Whilst there are certainly differences between the aims and methodologies of art and science, some discussed elsewhere in this book, there is little difference in the nature of the creative processes displayed in, for instance, mathematics and art.⁴

Drawing

As well as traits, aptitudes and characteristics that derive variously from genes or developmental environment there are also learnt skills that may be considered important for designers to acquire. Drawing skills have long been considered the sine qua non of art and design. You learn to see the world through drawing; it is the foundation of visual literacy; it is the prime means of communicating visual ideas. At the time of the Renaissance one of the interpretations of the word

drawing (disegno) was that of ‘the creative idea made visible in the preliminary sketch,¹⁶ a concept which embodies more than just the effectiveness of representation. Drawing is also widely understood to provide a rich way of exploring and coming to understand the world about us with marks on a surface describing not only visual experience but attitudes to them.

Hobson¹² reminds us, however, of the contents of most portfolios of design course applicants – of the stunning skills shown in drawing a green pepper from which we assume the applicant’s capacity to be a designer – and suggests that the observational skills employed in exercises such as this (and in ubiquitous life drawing) are rarely employed elsewhere. Graphic designers, he says:

should possess skills that enable them to make analytical, intellectual and conceptual judgements. Observation should be a prelude and an aid to deduction. ...By using drawings as our sole benchmark of creativity (as we have for centuries) we are denying access to our courses for a large number of perfectly capable problem-solvers and visual information communicators.

I am tempted to mount a defence of drawing skills from the apparently safe design quarter of illustration but even then I am aware of the non-visual components involved in ‘solving’ the problems in a given brief and of the mechanical options, e.g. photographic and digital, for providing visual output. I continue, however, to be impressed by the assistance gained through externalising a visual idea as a drawing, by the insight that goal-directed mark-making (a.k.a. drawing) gives into matters of space, light and texture for instance and by the intellectual gains from the rigour involved in the process. Also by the understanding that objective drawing gives of the relationship between eye, brain and reasoning. On each reading, however, I come to find Hobson’s argument more persuasive.

He goes on to paraphrase Professor Richard Buchanan’s reminder that design is not the art of expression but of forethought and cites Katherine McCoy (from the 1996 New Era, New Language conference) as saying that:

Designers need a pluralistic and agile tool kit of strategies to apply to the universe of communications, messages and audiences. Appropriateness is the criterion.

I also find myself warming to his suggestion that linguistics should feature in more design programmes being, as it is, essential to visual communicators – manipulators of the visible manifestations of language.

Literacy

Perhaps the jury is now out on drawing but the ability to communicate with words has become a serious issue in recent years. It is increasingly considered

that students from all disciplines graduate with too low a standard of literacy and that the reasonable expectation of employers – that someone with a degree be able to speak and write coherently and be able to observe standard linguistic conventions, such as those of spelling, grammar and punctuation – is no longer being met. An anecdotal reference by David Starkey in the *Sunday Times* quoted a ‘long serving external examiner’, after discussion of a scribbled and chaotic examination paper, as sighing, “I never thought to see the age of the illiterate first, but it’s arrived”. How, he asks, can young people of such talent and dedication have passed through 15 years of education and emerged, at best, half-literate?

I do not believe the assertion of successive governments that standards have not dropped and I know of no colleagues who do. Dumbing down is an inevitable consequence of encouraging rises in admissions which are unrelated to the talent pool and, with universities ranked amongst other things by their proportion of first-class degrees, it is understandable why this activity is familiar at many levels. Whilst there are, however, excellent students as there have always been, albeit in the company of significantly weaker ones, it is my purpose here to consider design applicants at the point at which they knock at the doors of a degree course. I shall not try to explain either how they came to be in the state in which they arrive or how the standards are set by which they are finally judged. In this context, therefore, it is necessary to consider what level of literacy constitutes a reasonable prerequisite for a design course and whether a design course should expect to take on the responsibility for remedying existing deficiencies.

The place of the dissertation on a degree course in design is argued elsewhere¹¹ but if the exercise is to be a meaningful part of a student’s study then it deserves better than the uninformed, unstructured, ungrammatical, stream-of-(semi)-consciousness response it has been known to invite. It is also necessary to be able to communicate clearly to others – to clients, colleagues, technical services – and sometimes to write copy. But even more important is the need to be able to express ideas clearly to oneself as part of the internal feedback processes of problem-solving and, in addition, because natural language is a necessary step towards understanding abstract concepts. Being able to define a problem is a major part of solving it. Language is the foundation of thinking.

Computing

It is clear that all designers, both now and for many years, will necessarily have some level of involvement with digital practice. At one extreme web design will require deep immersion but even the illustrative watercolourist will need to recognise the constraints on hand-artwork which is to be reproduced via a digital press. The ubiquity of ‘new’ technology will render all designers conscious of the need for digital skills, although at some point in the future computing is likely to

become sufficiently embedded for the emphasis to revert from mechanism to function. Many current design students are destined to play a vital and exciting role in shaping our experience of a digital future but Chapman, Fisher et al⁷ find that:

The experience of teaching students how to use computers for their design work suggests that three clear and distinct attitudes towards computers exist within every group of new first years – enthusiasm, fear or disdain. As they move through the three years of their course, it becomes clear that the enthusiastic students – usually small in number and already skilled with computers – rarely develop into good designers. They develop their computer skills, but find it hard to use these skills to produce inventive design work. We dubbed this group ‘the nerds’, and while this may seem unkind it can be noted that some computer enthusiasts take this label as a positive accolade.

Openness to the possibility (or probability) of using computers is therefore more important at the course entry stage than experience of using them, and experience of using them gained in other domains does not necessarily transfer usefully to art and design.

I do not, however, understand the concept of computer literacy any better than I would that of, say, electric motor literacy. There is no mystique to the technology. You need the skills of word-processing or image-manipulation or 3D-modelling and it just happens that the tasks can all be carried out using a box called a computer. You also need an appreciation of the appropriate uses of digital technology in the design field – just as you might need to know about the advantages and limitations of lithography, letterpress or gouache. But an even bigger red herring is that of ‘keyboard skills’. You want a ‘y’, you hit the ‘y’ key – not a significant task unless you aim to become an accomplished typist.

Maturity

Maturity is an issue when selecting students for any high-level course as intellectual readiness is as important as satisfactory technique. Maturity tends to come with age, although old heads can be found on young shoulders (and vice versa) and older applicants are often welcomed for the extra experience and alternative perspectives they have acquired through rubbing shoulders with life for a little longer. Although the encouragement of ‘lifelong learning’ portends a new balance, the majority of students starting a degree course in 2000 are likely to be reaching the end of their teens.

I recall once being a teenager myself but am aware that the experiences, knowledge, hopes and aspirations of each new intake largely differ from mine at their age. Having insulated myself from the realities of modern teenagery through the strategy of not having had children I can struggle to understand the

culture that informs them; (culture: the arts and other manifestations of human intellectual achievement regarded collectively; a refined understanding of this; intellectual development). It was ever thus. My classic films, revered books and key moments of history are not theirs. I know that almost a third live in one-parent families, that 42% have tried drugs by 16, that 14% of girls are unhappy about their legs and two thirds would like to lose weight though only one in eight is clinically overweight, that half want to own their own businesses and that 21% expect to be millionaires²⁷ but none of this opens up much common ground from which to share intellectual journeys. It is the discipline of design that will bind us together for three years.

These young adults are likely to have a very different attitude to the educational process in which they are embroiled to that of 20 years ago. Often explained as the product of a post-Thatcherite consumer society, it is not my intention here to discuss the merits of the socio-political environment in which they grew up. It is important to acknowledge, however, that both their demands on a degree course and its demands on them have changed. Many seem strangely uninformed (Greenaway, Dickens and Hiroshima have all drawn blank looks recently) and this begs important questions about the extent to which the student must be fit for the course or the course fitted to the student.

Square pegs

Universities increasingly feel obliged to define the key skills that a student should possess on graduating – to define graduateness (sic). This obligation comes partly from government directive, partly from the perceived requirements of employers and partly from a culture of answerability. Bureaucracy appears to require that an illusion of order and control is imposed on the dangerously organic processes of educational growth and creative development. And so, administration having become the new guardian of academic probity, every course is decorated with labels deconstructing its purported learning outcomes, every detail is recorded in a tick-box. It is as if constantly weighing the pig makes it fatter.

Like lifelong learning and the need for multi-skilled, flexible workers to increase our global competitiveness, key skills have all the necessary ingredients of first-rate educational slogans. They fully satisfy the motherhood-and-apple-pie test by advocating practices to which no one could possibly object, and they are so vague and nebulous that they can be made to include just about anything... The pursuit of such skills... is nothing more than a chimera hunt, a disastrous and costly exercise in futility.¹³

There is a conflict with the ethos of courses that have traditionally offered students the opportunity to discover their talents through a process of immersive

study; a conflict between mechanistic and quantitative approaches to art and design education. The prescriptive style is potentially at odds with the very variety of people on which a healthy society thrives; it militates against the extremist and the eccentric, the freak and the genius; it prefers grey to black and white – and creatives are rarely grey.

Creative thought is innovative, exploratory, venturesome. Impatient of convention, it is attracted by the unknown and the undetermined. Risk and uncertainty stimulate it. Noncreative thought (the term is not derogatory) is cautious, methodical, conservative. It absorbs the new into the already known and expands the existing categories in preference to devising new ones.¹⁷

The creative individual is often seen as unconventional and associated with atypical characteristics. For example, anecdotal but informed sources suggest that there is a much higher incidence of dyslexia in art and design than in other university departments. Dyslexics are often visually gifted, their brains thought to be ‘wired’ differently so that their disposition is less verbal and more visual/spatial, which leads to a heightened intuitive sense of observation and ‘clarity of vision’.⁸ Typically cited dyslexic ‘creatives’ are Leonardo da Vinci, Winston Churchill, Susan Hampshire and Richard Branson (an entrepreneur who can’t tell ‘gross’ from ‘net’). Certain astrological signs have also been associated with creativity as has sinistrality (left-handedness) though, interestingly, ambidextrous children scored low on tests to measure verbal, reading and mathematical ability – widely judged to be measures of intelligence.¹⁰ Whilst it is useful to note such attributes, it is unlikely that their known presence could play any part in the assessment of a student’s creative potential.

Even the teaching environment is unlikely to be able to offer the best support to all creative talent. A design course typically (and understandably) is likely to present one communal work space for all and one timetable for all yet we know that different people work best in different conditions. Some need noise and some need silence, some need company and some solitude, some need very specific conditions. Dr Johnson needed a purring cat, orange peel and plenty of tea; Balzac needed to work at night with strong, black coffee; Freud chain smoked and Coleridge used opium; Zola required artificial light; Carlyle and Proust both sought soundproof rooms; Sciller needed the smell of decomposing apples wafting up from his desk drawer; Kipling had to have the blackest ink; Descartes could work only in bed but Bulton had to be fully and properly dressed.

The recipe

Napoleon wished for his generals to be lucky. That would also be a valuable property for a designer to possess but could be considered a secondary level

attribute, accounted for by primary level attributes such as dedication and persistence which lead to immersion in the subject and conscientious practice, conditions under which luck is most likely to show itself. Our hypothetical genetic engineers should concern themselves with primary characteristics.

The designer of designers must create a product which displays an appropriate type of intelligence, is independently minded and is able to retain individuality in an academic world of grids and tick-boxes. Whilst some models should possess the personality factors which enable effective interaction in a team, others may be allowed to exist as self-sufficient lone players. The artefact should be available in both male and female options and must display maturity and reliability throughout the age range on offer.

It should be able both to express ideas visually and to express visual ideas clearly in natural language, though strength in one of these areas may be allowed to compensate for weakness in the other. Literacy and good drawing skills are likely indicators of these traits though either may, on occasion, be waived. Many other skills are coveted accessories that can be acquired later but, more important than their existence at the outset, is the preparedness to acquire them when needed and the mental flexibility to recognise that need. The top-of-the-range model will be zealous (inspired by intense enthusiasm), assiduous (hard-working and persevering), pertinacious (doggedly resolute) and with acuity (keenness of vision and thought) coming as standard. A random element in the genetic programming may also be desirable in order to throw up the occasional (but valuable) temperamental genius, infant savant or other maverick designer who will prove brilliant but awkward.

Of all the traits that could be prescribed for ud2k, however, my own priority would be for the creature to display just two, neither of which I have specifically mentioned until now. They are curiosity and rigour. Between them they will lead the student to enquire, to discover and to playfully extend the knowledge envelope. They will both make demands of the student and provide the means for satisfying them. They will lead towards novelty and will guarantee application. This heuristic pair alone provide the very cornerstone of the creative act.

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