

Designerly well-being: implications for pedagogy that develops design capability

Kay STABLES

Technology Education Research Unit, Department of Design
Goldsmiths, University of London
k.stables@gold.ac.uk

Abstract: *The concept of "designerly well-being" identifies the value for individuals and society of the development of design capability inherent in all humans. This concept builds on ideas more generally of capability, well-being and democratic design. The paper explores pedagogic issues, particularly in relation to the development of an individual's understanding of themselves as a designer, how they engage effectively in the processes of designing and how they develop the confidence and confidence to positively exploit their own designerly capability in their personal life, social and community life or professional life. Key to this is the stance of the educator on the processes of designing. The paper will present research that make the case for an iterative, dynamic view of process, responsive to the changing demands within any design or design related task. This research illustrates the importance of recognising the preferred approaches to design activity of individuals and the importance of supporting individual preferences whilst building new strengths to establish a repertoire of design methods, processes, knowledge and skills. Achieving designerly well-being across society is ambitious. In considering pedagogic approaches that could support this ambition and drawing on research findings from projects with primary and secondary aged learners (ages 5-18), the relationship between individual approaches to designing*

and the way design challenges are presented structured will be explored.

Keywords: *designerly well-being, design pedagogy, design education research.*

A NOTE TO AN INTERNATIONAL AUDIENCE OF DESIGN EDUCATORS.

While this paper is about design education, there is a need to understand the context in which this operates globally, within general education, where design is commonly included in Design and Technology Education or Technology Education. For this reason both Design and Technology and Technology education are drawn into the case presented through the paper. This is not to suggest that they are seen as interchangeable terms, but to recognise the reality of the strong links between them in general education.

Introduction

Historically and currently, design educators, design professionals and policy makers have made a case for the value and importance of design education. This can be seen in the British context from initiatives dating back to the industrial revolution right up to the present day where a major push is evident through groups such as the Associate Parliamentary Design and Innovation Group, the Design Council and the Design & Technology Association. But throughout this history there has been an ongoing tension between views on why design education is seen as important. At a simplistic level there is a dichotomy between those who see design education pointing towards the development of a capable and competent design profession and those who see it as the broader development of the designer in us all - of the development of potential design capability as part of the overall growth of rounded, capable human beings.

This overarching dichotomy has embedded within it further, more subtle, divisions. An argument might be made that 'professional' design education is the province of tertiary education and the 'human capability' model is the business of general education. On the face of it this has a certain logic, but in fact the split between what might be called the 'instrumental' and the 'liberal education' standpoints has dogged general education throughout history – providing a 'top down', assessment-led model of education that has seen schools providing a 'watered down' and stereotyped view of professional design education, in order to prepare the small percentage who choose to take this route

into adulthood. In tertiary education it could be argued that the 'instrumental' view has also skewed design education towards a narrow vocationalism, preparing far more disciplinary designers than the world is ever go to manage to employ. Recent debates has seen a reaction against this with calls for more interdisciplinary approaches (Buchanan 2001) that enable design's broader contribution to what have been called Big Design ideas (for example addressing the need for clean water globally, or dignity in healthcare).

Threading through these arguments is a further subtlety – if design education is seen to be a good thing, and yet not everyone is going to become a professional designer, then what are the rest being educated for? An answer emerging ubiquitously is that the world would be a better place if everyone had a design 'literacy' (or sometimes design and technological or technological literacy) - an understanding of design that makes people critical consumers and users of the designed and made world. This sentiment can be seen in curriculum policy statements such as the following from 'Technology for all Americans' (ITEA 1996)

Because of the power of today's technological processes, society and individuals need to decide what, how, and when to develop or use various technological systems. Since technological issues and problems have more than one viable solution, decision making should reflect the values of the people and help them reach their goals. Such decision making depends upon all citizens acquiring a base level of technological literacy - the ability to *use, manage, and understand* (my emphasis) technology. (ITEA 1996, p.6)

It is also echoed in the 'call' for papers for this current conference, where it is stated that

To promote sustainability and meet global challenges for the future, professional designers are dependent on critical consumers and a design literate general public. For this purpose design education is important for all. (DRS // CUMULUS The 2nd International Conference for Design Education Researchers, Call for papers)

It would be difficult and indeed foolish to deny the importance of design (or technological) literacy, and in fact a strong case is made for the democratic value of this by Baynes (2005). However, there is a danger if this viewpoint is indicating the *total* value of design education to those that won't become professional designers, rather than just an important element of it. In this paper I present an argument for a 'capability' rather than 'literacy' view of design education that

contributes to a concept of holistic “designerly well-being”. I will then present pedagogic ideas and research that support the development of designerly well-being.

Capability, well-being and designerly well-being

Before going further, it will be helpful if I outline what I mean by “designerly well-being”. The relationship between design and well-being is increasingly being explored to good effect through academic research and professional design, but the emphasis within this tends to be on effective ways for designers to engage in participatory design to produce products that support the well-being of others, for example who have a disability, or need health care (e.g. Larsson et al, 2005; Dilani, 2009) or on effective ways for designers to engage with models of sustainability in developing consumption-reduced models of well-being (Manzini, 2004). In both of these the emphasis is on what is produced in the name of well-being, not on the well-being of the ‘designer’. I have presented elsewhere why I consider that it is important for the well-being of individuals and society to have design capability developed in all human beings. (Norman et al. 2010; Stables 2012). At an overarching level I am referring to enabling all humans to have the satisfaction, pride, confidence and competence to engage in designerly *thinking* and *action*, with criticality and capability, in their daily lives.

This vision builds on certain fundamental ideas, the first of which is the view of capability promoted by the economist Amartya Sen through his ‘Capabilities Approach’. This presents a seemingly simplistic but profound view of capability as what a person *can be* (values and beliefs) and what a person *can do* (agency), and the freedom this enables. (Sen 1992). The second idea is a capability-based conception of well-being (as opposed to a ‘desire’ or ‘happiness’ based concept) developed by the philosopher Martha Nussbaum in conjunction with Sen (Nussbaum 2000, 2011). This view promotes the idea that well-being is based on achieving the ‘functionings’ or central human capabilities that present a spectrum of living, from bodily health and integrity to practical reason, imagination and thought, emotion, affiliation, play, and life itself.

The third idea is that all human beings are designers - that our design capability is one of the defining characteristics of being human. (Archer 1992; Baynes 2006; Black & Harrison 1985; Bronowski 1973; Csikszentmihalyi 1996; Nelson & Stolterman 2003). Enacting this capability in a way that draws on our beliefs and values, having a sensibility to all that it means to be human, and that liberates with the

impact of agency, might seem somewhat utopian. But my proposal is that this is the basis of designerly well-being. However, as with all utopias, designerly well-being needs to be nurtured. It is here that design education has an important role to play for all humans, not just those who choose to operate at a specialist, professional level.

Designerly well-being and democracy

If all humans have design potential, then the way that this potential is realised raises important issues for democratic societies. Ken Baynes puts forward the idea that, just as Noam Chomsky talks of humans having a Language Acquisition Device, so too humans have a Design Acquisition Device that is a " 'wired-in' predisposition to explore and change their environment". (Baynes 2010, p 7). As with language he points out the importance of this device being supported and developed through education. He points out that

although some of these young people will become professional designers ... the large majority will be managers or citizens who have a range of design skills and ability to understand design and designing. They will be able to use these to enhance their personal lives and to improve their performance wherever their work brings them into contact with design. (Baynes 2010, p.18)

Presenting ideas from the 19th and early 20th century and drawing on the likes of Ruskin and Morris, he explores the relatively short history of a view of design as specialist professional activity and illustrates this view by modifying a quote from Eric Gill (1940) suggesting that "the designer is not a special kind of person: every person is a special kind of designer". (Baynes 2005 p.34)

He also identifies however, that the view of all humans as designers is a complex one and very much in conflict with a view of designers as specialists. He refers to the growth of literature from the 1970s that produced large amounts of publishing on the specialist fields of design that was not paralleled by publishing on the role of humans as designers in a more general sense. His argument is that design criticism from that era was modelled on art criticism and celebrated the prowess of what he refers to as the 'hero-designer', that marginalised the important role of teams in the processes of design. In addition the products of the 'hero designers' were often celebrated before there was any real idea of how valued their products would be when seen in a social, economic or

environmental sense. In discussing this idea he draws attention to the lack of recognition given to the user or consumer.

He also recounts a history that shows that the model of general education that emerged was one of the "watered down version of professional training". (Baynes 2010, p.28)

While Baynes is an advocate for developing the active capabilities of designing through imaging and modeling ideas, much of the focus he gives to the democracy of design is on the role all humans can play through their roles of consumers and users. He comments that, even today, design professionals are slow to develop ways in which consumers and users can engage directly in the creative, generative, modelling processes within design and highlights how the general public can be marginalized.

design may be considered radical simply because it brings about fundamental changes in material culture. However, in the political sphere, there is the issue of power. Who has access to design skill? Who controls and benefits from it? (Baynes 2010 p. 55)

He also hints at the dangers of leaving all design entirely in the hands of professional designers because of the way that professional design is driven by market concerns. When considering environmental issues he points out "in fact, designers have made relatively little progress in being able to tackle these issues whenever they fall outside somebody else's commercial or political agenda." (Baynes 2010 p. 57)

This somewhat paternalistic view of the agency of design resting with professional designers has been voiced by others. Michael Shannon, making a case for public design education in 1990, raised the issue of disempowerment.

No one *has* to discover or design any longer, and those who might be inclined to are discouraged by the high levels of specialized knowledge required. Many people feel isolated, unfulfilled, unable "to make a difference. (Shannon 1990, p.36)

Both Baynes and Shannon are presenting a perspective that runs counter to the notion of designerly well-being for all humans. Steve Keirl raises similar concerns about the general population being eliminated and alienated from design decisions and in doing so argues for a design education that highlights the importance of critique and of challenging what is happening in the name of progress. His view is that the only appropriate or "good" form of design education is one that is based around ethical practices that involves "critique" at the same time as

"intention". He expresses particularly concern about uncritical design activity, highlighted by the following statement.

Our capacity to design and make sets us apart from other species although our capacity to head into the future uncritically may, in another sense, not set us so far apart at all! (Keirl 1999. p 79)

What the arguments above highlight is the importance of design education to equip young people to be able to contribute in an informed and critical way to more a democratic view of design. This view echoes the Capabilities Approach to well-being put forward by both Sen and Nussbaum. In turn, this view is integral to a motivation and confidence to contribute actively and creatively to the processes of designing, either through generic everyday activity, or through more specialist design activity.

The importance of making

In parallel with exploring the need for developing a more reflective, critical dimension of designerly well-being there is also considerable importance in considering the more tangible, visceral dimensions that come through the act of making. I am not attempting here to reinforce an unhelpful dichotomy between 'doing' and thinking', but to maintain a balance in sharing dimensions that inform on the concept of designerly well-being. It is important to understand the ways in which making provides alternative ways of knowing, as (for example) has been made vividly clear by the fascinating ethnographic studies of craft apprentices by Trevor Marchand (2008). In observing the way learning and teaching takes place in three disparate settings (minaret builders in Yemen, mud masons in Mali and fine woodworkers in London), Marchand considers the nature and communication of *embodied knowledge* and the way this is negotiated, understood and learned through the practice of making.

Knowledge is not confined to the sorts of concepts and logical propositions that are expressed in spoken language. ... Knowledge necessarily extends to other domains including emotional, sensorial, spatial and somatic representations. Though these domains may be defined as faculties of knowledge 'beyond language', they are nevertheless learned, practised, expressed and communicated between actors, most evidently with the body. ... contest[ing] standard divisions made between a 'knowing mind' and 'useful body', and direct[ing] researchers to assiduously heed actions as well as words. (Marchand 2008 p 257)

He also draws attention to the extent to which what is being learned goes beyond technical know how and skill, creating resonance with the Capabilities Approach to well-being as he describes the richness of the learning.

These include technique, worldviews and a set of guiding principles for ethical judgement; and in some cases, training encompasses devotional religious practices, the performance of magic and correct enunciations of powerful benedictions. (Marchand 2008, p 250)

The explicit relationship between craft activity and well-being has seen increased interest in recent years and points to further valuable insights to designerly well-being. In a briefing note for the Crafts Council, and drawing on their recent report 'Making Value' (Schwarz and Yair 2010; Karen Yair 2011) highlights the breadth of ways in which craft practices and craft practitioners contribute to human well-being. Referring to case studies from the 'Making Value' report, Yair indicates a range of ways that practitioners have worked in community and education settings, demonstrating benefits to the well-being of people with disabilities and to those who feel socially excluded.

Collectively, it seems that these distinctively craft based experiences encourage a sense of achievement and ownership. This, in turn, builds the confidence that strengthens social interaction and ultimately well-being: research suggests that social connectedness is perhaps the single most important factor in distinguishing happy people from those who are merely 'getting by'. (Yair 2011)

In addition she highlights the growth in social craft activities such as knitting circles and other craft related clubs and groups. Linked to this she identifies the work of Betsan Corkhill, a physiotherapist who has undertaken extensive research into the therapeutic value of the craft of knitting in supporting well-being, for example in the management of pain, addiction and dementia. (Corkhill 2012)

In a schools learning context, the importance of hands-on learning, has been emphasised for more than a century through educational models such as 'sloyd'. There is a current growth in interest, as can be seen, for example, through Guy Claxton and Bill Lucas' recent report "Making it" (Claxton et al. 2012). In presenting a model of studio teaching, they draw on work such as Matthew Crawford's "The case for working with your hands" (Crawford 2010), and the pedagogies of MIT's Project Zero team, including 'studio habits of mind' (Hetland et al. 2007). Through research with teachers that focused on pedagogic 'dimensions'

of studio teaching (such as creating authentic activities; organising space; making learning) they focus on building learning power in what they refer to as the 'four Rs': Resilience (emotional strength); Resourcefulness (cognitive capability); Reflection (strategic awareness); and Relating (social sophistication). Of particular interest in the context of designerly well-being, classroom trials indicated the biggest change in learners was their independent decision-making and the confidence gained through managing their own learning. They also noted

Our indicators of learning engagement include attentiveness, absorption, observable effort willingly given, indications of pride and the willingness to talk with animation about the learning taking place. (Claxton et al. 2012, p. 8)

Pedagogic ideas and issues

While there are some notable projects presenting models that support the concept of designerly well-being, there is also evidence of practice that is having quite the opposite effect. Over the last two years, England has seen a number of reports all expressing views on the importance of design education in schools and also highlighting the strengths and weaknesses of what is on offer, particularly through the school subject of Design and Technology (Ofsted 2011; Ofsted 2012; DfE, 2011; Miller 2011; Henley 2012; Design Commission 2011). A more detailed account of the issues raised across these reports appears elsewhere (Stables 2012) but the headlines indicate that there is general support for the contribution of Design and Technology. Where it is taught well it is a popular subject, teachers have high expectations of learners, present challenging and ambitious projects set in relevant contexts. Such teachers fascinate and intrigue learners, engendering 'palpable excitement' when learners are engaged in their work. However, this is only one side of the story and the 'flip side' indicates a subject that is too often formulaic, too narrowly focused, lacks challenge, spends too much time on worthless tasks and too often results in a string of unfinished projects. While there is clear evidence of the potential for the development of designerly well-being through teaching that is enlightening, inspiring, challenging and innovative and that sparks enthusiasm and passion, and develops competence, confidence and pride, what is clear is that new pedagogic models and ideas are needed. Lauren Resnick (1987), in articulating what she sees as the difference between 'in-school' learning and 'out of school' learning, identifies distinctive polarities, such as individual cognition versus

socially shared cognition, symbol manipulation versus contextualised reasoning, generalised learning versus situation specific competence, that increasingly make ‘in school’ learning “coming to look increasingly isolated from the rest of what we do” (Resnick 1987, p. 15). These views from more than 25 years ago have resonance with the escalation of initiatives that provide learning opportunities beyond formal classrooms (and often celebrated through the likes of TED Talks, or raised through the concept of the ‘flipped classroom’) that are exciting, relevant, challenging, risky, socially engaged and motivating and that develop creativity, innovation, responsibility, confidence, competence. All of these can be seen to support the development of designerly well-being. The contrast between in and out of school learning caused me recently to draw the conclusion that

In school we get to do the worthy but often un-inspirational stuff – that meets the needs of a curriculum full of content and monitored by an assessment regime that is stifling it. Out of school we get to do the inspirational, exciting, challenging stuff that (in my view) nurtures designerly well-being. (Stables 2012, p. 430).

But if this is (too often) the case, then what is to be done? While we may not have all the answers, there is a wealth of educational research to be drawn on to provide pointers to effective pedagogic approaches and I will turn now to some key considerations, beliefs and ideas and the research undertaken at Goldsmiths in the Technology Education Research Unit, that has underpinned them.

Over the last 25 years we have undertaken a series of research projects that have explored ways of developing and assessing design and technological capability. Throughout these research projects, certain critical aspects of learning and teaching have been highlighted, all of which have some bearing on developing designerly well-being.

- Supporting design activity – views of process
- The centrality of imaging and modelling ideas
- The ‘need to know’ as the driver for learning
- Structuring activities – choreography not management
- The importance of authenticity

What follows is an articulation of these aspects and an account of related pedagogic issues and approaches the research provoked.

Supporting design activity - views of process

In the 1980s we undertook a research project, funded by the UK Department for Education, in which our brief was to assess the design and technological capability of a 2% sample of UK 15 year olds (10,000 learners). Our findings, based on the analysis of 20,000 short (90 minute) design activity portfolios, based on an authentic activity instrument created for the research (Kimbell et al 1991) highlighted the importance of performance and process in understanding this capability and resulted in us proposing and confirming an iterative model of process in which designing is seen as complex, non-linear, driven by an iteration of thought and action and a determination to take a hazy starting point of an idea and relentlessly pursue it through to a fully developed prototype or outcome. The model was articulated through the diagram shown as figure 1, below.

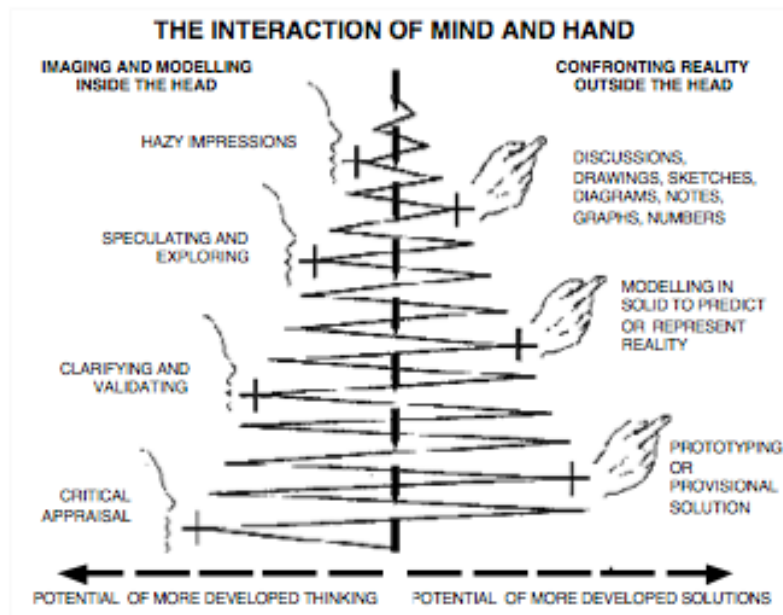


Figure 1. The APU Design & Technology model of process (Kelly et al. 1987)

This initial research allowed us to profile ways in which learners approached the processes of designing and to see how these approaches impacted on their performance. At a simplistic level, using the model in figure 1, we could identify learners whose approach had a 'reflective skew' or an 'active skew' and also where the approach showed a balance between action and reflection and, where this created good performance, that action and reflection were bound together by an iterative web of thought and action that supported strong growth of

ideas. Delving deeper into these 'holistic' profiles indicated that, while there were aspects that characterised high or low level performance in design activities, there was no one way of being good or bad. There was no uniform process to be witnessed. This posed a dilemma for schools education at that time (and, to an extent, still today) as the orthodoxy was of a single, linear view of process (identify a problem; research; generate an idea; make it; evaluate it). Because of its perceived uniformity, this linear process supported the teacher in managing and assessing design work. The research team, however, became increasingly aware that the model we had created had resonance with research going on beyond the school context (e.g. Darke 1979; Buchanan 1995; Cross 1982; Lawson 1990; Jones 1980). Building from this first project, further research projects have added to our understandings of processes of designing such as individual preferences or 'designing styles' (Lawler 1999, 2006) and the ways these can be affected (for good or ill) by pedagogies adopted by the teacher.

The centrality of imaging and modelling ideas

If the process of designing is not governed by a pre-specified linear set of steps, then what is driving the process? The initial research indicated that the lynchpin was the growth of ideas and through more recent research involving analysis of a range of design portfolios submitted for GCSE (English national assessments at age 16) and the subsequent development of a six hour design activity undertaken by 350 learners, we qualified this further as 'having', 'growing' and 'proving' ideas. (Kimbell et al. 2004) Having parallels with what Jane Darke referred to as the 'primary generator' (1979), our research through up a further challenge for pedagogic orthodoxy in schools – that having done some research, learners should put forward a series of ideas (often by drawing 4-6 boxes and putting one in each). We were looking throughout a total design activity for every small spark of a new idea (having) and then seeing what the learner did with each of these ideas (growing) and how they made decisions about their development (proving).

The 'need to know' as the driver for learning

Having an understanding of the role of ideas in driving the process of designing, we also needed to understand what was the drive for the learning taking place. Returning to the orthodoxy, teachers typically work out what they want to teach (that may or may not coincide with what learners want to learn) and structure a project where this teaching

can be wrapped up in a palatable form. Our hypothesis from the early research was that any design challenge would allow learners to draw on what they already knew and could do and that, importantly, would also act as a catalyst for the 'need to know' new things. This meant that when looking to assess capability, we were more interested in whether the learner could identify what they needed to know and had an idea of how they could find out, that what they already knew. In more recent research (Kimbell et al. 2006) we actively sought data from learners (10 – 12 year olds) at the end of a design activity about what they had found easy, what they had found difficult, what they had learnt and what they wanted to get better at. Their responses gave insights into where learning and teaching knowledge, skills and understanding fitted in for the learners. Responses also indicated the extent to which they could begin to take responsibility for their own learning – to become what Glaser (1987) called " 'expert novices' who, although they may not possess sufficient background knowledge in a new field, know how to go about getting that knowledge." (1987 p.5)

Structuring activities – choreography not management

Having created a model to characterise the processes of designing, we also found that we had provided ourselves with a framework for structuring activities that presented an alternative to the prescriptive, management focused, linear model. This framework has been important because much of our research has required us to structure short design activities (typically between 90 minutes and 2 days) in order to explore aspects of learners' performance. These short activities, and the portfolio structure that has characterised them, we came to term 'unpickled portfolios' (Stables & Kimbell 2000) to distinguish them from extended projects where learners are 'steeped' and 'infused' in a lengthy learning experience. In creating the framework we have been mindful to take our lead from the model – so the model anticipates that the process begins with that initial spark of an idea and that learners are then prompted through a series of active and reflective "sub tasks" designed to scaffold, in a responsive (rather than prescriptive) way, performance of design and development. We have taken the concept of choreography to describe this approach and to distinguish it from more prescriptive, linear, management models of designing.

To illustrate how tasks were structured in this way, the following is an illustrative sequence of events for a six hour task, starting after the design challenge has been presented.

- Put down first ideas
- Swap work with 2 team mates – for further development
- Review ideas and continue individually with early development using drawing and/or 3d 'sketch' modelling
- Pause and reflect on end user and context of use
- Continue development
- Record development photographically, and comment on progress and next steps
- Repeat development and recording at 45 minute intervals
- Swap work with team mates for 'critical friend' reviews
- Review comments
- Fast-forward development with an annotated sketch to show how a completed outcome would be.

Part of the framework for this task was created through the dynamic collection of work in a portfolio that was created by a customised unfolding booklet (figure 2) that allowed learners to keep sight of their total work as ideas progressed.

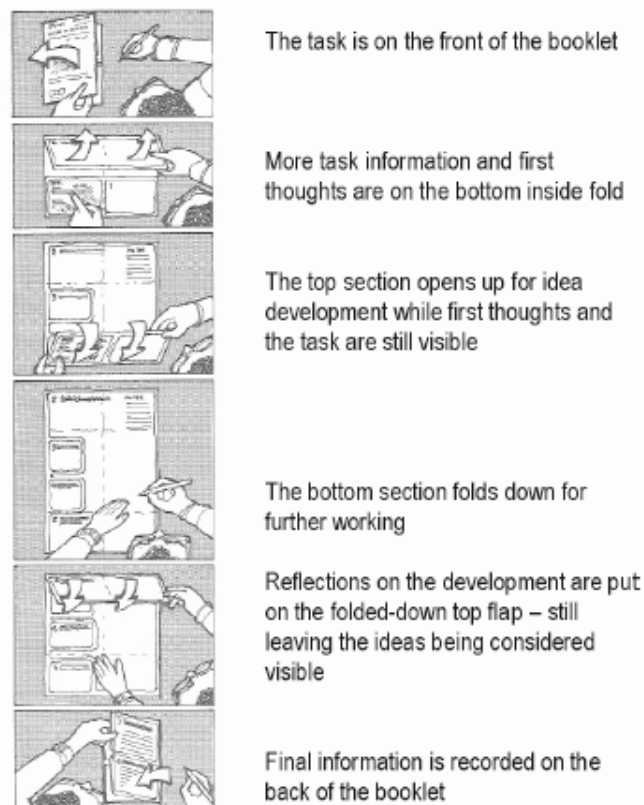


Figure 2 the unfolding booklet of the unpickled portfolio (Kimbell et al. 1991)

Throughout our research we have collected data on the response of both learners and teachers to the design activities we have used and consistently we have received positive responses to the value of the way the activities have been structured, including the way in which what might appear to be a straitjacket has been perceived as liberating – supporting creativity and innovation. The structure seems to become invisible as the learners focus on the development of their ideas, rather than how to organise their work. In current research, the paper portfolio has been entirely replaced by a digital one, in which learners can draw on a range of text and imaging tools to develop their ideas, with all drawings, photos, videos, audio files, text files being seamlessly uploaded to a dedicated web space every 20 seconds. This shift to a digital portfolio has provided greater flexibility through the choice of reflection and documenting tools, supporting a broad range of learning styles and learners with special educational needs, while the active/reflective choreography of the original model remains in place. (Kimbell et al. 2009)

The importance of authenticity

The starting point for the original research in the 1980s was to assess design and technological capability by trying to understand what is actually going on during the performance of designing, rather than how well learners could jump through a set of hoops that had been pre-defined as a design process. Thus, from the outset, we were keen to attend to authenticity – both of the process and its dynamic documentation, as described so far, and also of the design challenges presented to the learners. In the initial research we needed draw learners quickly into both an understanding of what a design challenge is and the context in which we were setting a series of challenges – and we did this through presenting snapshots of scenarios, issues and fertile ground for finding design tasks through short videos. More recently we have presented design challenges supported with resources such as user profile cards, image banks and handling collections of ‘inspirational’ objects. The aim in all of this has been to present authentic challenges what we have referred to as ‘context-rich tasks’. The breadth of learners we have worked with has involved us in writing stories for six year olds who were designing for someone that they missed, creating scenarios around transporting medicine in heat and across rough terrain as a preamble to design tasks with teenagers in South Africa and presenting user profiles of people taking regular medication to both primary and secondary aged learners to support them developing innovative

solutions to a 'pill dispensing' challenge. In each case the aim has been to provide insight into the issues in a context along with motivating challenges and inspirational resources whilst leaving space for the learners to make the task their own. Feedback from teachers and learners has consistently been positive. In recent research we asked learners to give us specific feedback on what was inspiring them in the challenge they had been set. What was apparent was not just that the learners found all of the resources (design briefs, user profiles, inspiration objects etc) useful in various ways, but that they were able to make the tasks their own by the way the resources prompted them to draw on their own life experiences as well. This is captured in the following comment from the 'pill dispenser' challenge.

The thing that inspired me was that my granddad takes lots of pills so if I could create one this maybe would help him take it and not forget in the evening or the morning, forget to take them which would be very vital to his health. He has been a big role model in me creating this product. (Stables 2010)

Where does this take us for designerly well-being?

The research we have undertaken has provided a range of pedagogic approaches that support the development of designerly well-being. However, these approaches are likely to present challenges to teachers. They require a shift in understanding – of the nature of designing processes, of the value of a 'need to know' approach to learning, and of the importance of leaving space for the learner – in both the task and the process. Even if understanding shifts, the practicalities and challenges of managing more open, responsive and diverse approaches to designing and learning are considerable.

Ways of supporting learners to understand their own processes and, through metacognition, develop their own ways of bringing designerly thought and action to bear on challenges have become a cornerstone of our pedagogic approaches. While the insights we now hold have been derived empirically, seen more generically they are not unique within educational settings and have resonance with many learner-centred views of education. But even if adopted more broadly, would they, in themselves, develop designerly well-being?

In my view they provide a sound starting point, but aspects remain for further exploration and understanding. The following list begins to scratch the surface.

- How do we develop the combination of the capable designer and critical consumer– how do we develop what a person “can be” as effectively as what they “can do”?
- Do we understand enough about how to motivate learners and to deal with emotional challenge, such that they are willing to take risks, become confident and have faith in themselves as designers and as learners?
- If we can create “expert novices”, how then do we provide the necessary support and guidance to manage and resource the consequent ‘need to know’?
- What pedagogies within and beyond those in our research can we draw together and exploring to create a rich repertoire of tools for learning and teaching?
- Does the same value exist for exploring designerly well-being in professional design contexts?
- How will we know if achieving all of the above will impact on well-being in society?

The challenge is immense. Perhaps a start would be to understand better the emotional impact of design experience on learners. The story will continue.

References

- Archer, L.B. 1992. "The nature of research in design and design education." In *The nature of research into design and technology education*, edited by Bruce Archer, Ken Baynes and Phil Roberts, 7 - 14. Loughborough: Loughborough University of Technology.
- Baynes, Ken. 2005. *Design and democracy: Speculations on the radical potential of design, design practice and design education*. Wellesbourne, UK: The Design and Technology Association & Loughborough University.
- Baynes, Ken. 2006. "Design education: what's the point?" *Design and Technology Education: An International Journal* no. 11 (3):7-10.
- Baynes, Ken. 2010. *Models of change: the impact of 'designerly thinking' on people's lives and the environment. Seminar 1: modelling and intelligence*. Vol. Occasional Paper 3, *Design: Occasional papers*. Loughborough: University of Loughborough.
- Black, Paul, and Geoffrey Harrison. 1985. *In place of confusion: Technology and science in the curriculum*. London & Nottingham: Nuffield-Chelsea Curriculum Trust / National Centre for School Technology.

- Bronowski, Jacob. 1973. *The ascent of man*. London: British Broadcasting Corporation.
- Buchanan, Richard. 1995. "Wicked problems in design thinking." In *The idea of design*, edited by Victor Margolin and Richard Buchanan, 3-20. Cambridge, Massachusetts; London, England: MIT Press.
- Buchanan, Richard. 2001. "The Problem of Character in Design Education: Liberal Arts and Professional Specialization." *International Journal of Technology and Design Education* no. 11 (1):13-26.
- Claxton, Guy, Bill Lucas, and Ellen Spencer. 2012. *Making it: Studio teaching and its impact on teachers and learners*. Winchester: Centre for Real World Learning.
- Commission, Design. 2011. *Restarting Britain, Design Education and Growth*. London.
- Corkhill, Betsan. 2012. Therapeutic knitting study day manuscript: Knitting to facilitate change. www.stitchlinks.com: Stitchlinks CIC.
- Crawford, Matthew. 2010. *The case for working with your hands: Or why office work is bad for us and fixing things feels good*. New York: Penguin.
- Cross, Nigel. 1982. "Designerly ways of knowing." *Design Studies* no. 3 (4):221-227.
- Csikszentmihalyi, Mihaly. 1996. *Creativity: flow and the psychology of discovery and invention*. New York: Harper Collins.
- Darke, Jane. 1979. "The primary generator and the design process." *Design Studies* no. 1 (1):36-44.
- DfE. 2011. *The Framework for the National Curriculum: A report by the Expert Panel for the National Curriculum review*. London.
- Dilani, Alan. 2009. Psychosocially Supportive Design: A Salutogenic Approach to the Design of the Physical Environment. In *SHB2009 - 1st International Conference on Sustainable Healthy Buildings*; Seoul, Korea.
- Gill, Eric. 1940. *Christianity and the Machine Age*. London: Sheldon Press.
- Glaser, Robert. 1987. "Teaching expert novices." *Educationak Researcher* no. 16 (5):1. doi: 10.3102/0013189X016009005.
- Henley, Darren. 2012. *Cultural education in England: An independent review by Darren Henley for the Department for Culture, Media and Sport and the Department for Education*. London: DCMS/DFE.
- Hetland, Lois, Ellen Winner, Skhirley Veenema, and Kimberley Sheridan. 2007. *Studio thinking: the real benefits of visual arts education*. New York: Teachers' College Press.

- ITEA. 1996. *Technology for all Americans: A rationale and structure for the study of technology*. Reston VA: International Technology Education Association.
- Jones, J. Christopher. 1970. *Design methods: seeds of human futures*. London: John Wiley & Sons Ltd.
- Keirl, Steve. 1999. As if democracy mattered ... Design, Technology and Citizenship or 'living with the temperamental elephant'. In *IDATER 1999*. Loughborough University: loughborough University.
- Keirl, Steve. 2006. "Design and Technology Education: Whose design, whose education and why?" *Design and Technology Education: An International Journal* no. 11 (2):11.
- Kelly, A. V, R. A Kimbell, V. J Patterson, J Saxton, and K Stables. 1987. *Design and technology: A framework for assessment*. London: HMSO.
- Kimbell, Richard, Susan McLaren, Wesley Hamilton, and Paul Clewes. 2004. *Roboteers in residence: An evaluation for NESTA and the BBC*. London: Technology Education Research Unit, Goldsmiths University of London.
- Kimbell, Richard, and Kay Stables. 2008. *Researching design learning: Issues and findings from two decades of research and development*. Edited by William W. Coben, *Science & Technology Education Library*. Dordrecht, NL: Springer.
- Kimbell, Richard, Kay Stables, Tony Wheeler, Andrew Wozniak, and A. V Kelly. 1991. *The assessment of performance in design and technology*. London: SEAC / HMSO.
- Kimbell, Richard, Tony Wheeler, Soo Miller, and Alistair Pollitt. 2007. *e-scape portfolio assessment: a research and development project for the Department for Education & Skills (DfES) and the Qualifications and Curriculum Authority (QCA), Phase 2 report*. London: Technology Education Research Unit, Goldsmiths, University of London.
- Kimbell, Richard, Tony Wheeler, and Chloe Nast. 2006. *e-scape Phase 2 interim report to SEAC*. London: Technology Education Research Unit, Goldsmiths University of London.
- Kimbell, Richard, Tony Wheeler, Kay Stables, Tristram Shepard, Fred Martin, Dan Davies, Alistair Pollitt, and Gillian Whitehouse. 2009. *e-scape portfolio assessment: a research & development project for the Department of Children, Families and Schools, phase 3 report*. London: Goldsmiths, University of London.
- Larsson, Andreas, Tobias Larsson, Larry Leifer, Machiel Van der Loos, and John Feland. 2005. Design for wellbeing: Innovations for people. In *Proceedings of 15th International Conference on Engineering Design*, edited by A Samuel and W Lewis. Melbourne, Au: The Design Society.

- Lawler, Tony. 1999. "Exposing the gender effects of design and technology project work by comparing strategies for presenting and managing pupils' work." In *IDATER 99: International Conference on Design and Technology Educational Research and Curriculum Development*, edited by P. H. Roberts and E. W. L. Norman. Loughborough: Loughborough University of Technology.
- Lawler, Tony. 2006. Design styles and teaching styles: A longitudinal study of pupils' ways of doing designing following complementary re-grouping and teaching. Paper read at TERC 2006: Values in Technology Education, at Gold Coast, Australia.
- Lawson, Bryan. 1990. *How designers think: the design process demystified*. 2nd ed. Oxford: Butterworth Architecture. Original edition, 1980.
- Manzini, Ezio. 2004. "Context-based wellbeing and the concept of regenerative solution: A conceptual framework for scenario building and sustainable solutions development." *The Journal of Sustainable Product Design* no. 2:9.
- Marchand, Trevor. 2008. "Muscles, morals and mind: Craft apprenticeship and the formation of person." *British Journal of Educational Studies* no. 56 (3):27.
- Miller, John. 2011. *What's Wrong with DT?* London: RSA.
- Nelson, Harold G., and Erik Stolterman. 2003. *The design way: intentional change in an unpredictable world*. Englewood Cliffs, NJ: Educational Technology Publications.
- Norman, Eddie, Kay Stables, and Ken Baynes. 2010. Design education: nurturing the designerly but at what cost? In *Technological Learning & Thinking*, edited by Ron Hanson and Stephen Petrina. Vancouver: University of British Columbia.
- Nussbaum, Martha. 2000. *Women and Human Development: The capabilities approach*. Cambridge UK: Cambridge University Press.
- Nussbaum, Martha. 2011. *Creating Capabilities: The human development approach*. Cambridge, MA
London, UK: The Belknap Press of Harvard University Press.
- Ofsted. 2011. Meeting technological challenges? Design and technology in schools 2007–10. London: Ofsted.
- Ofsted. 2012. Making a mark: art, craft and design education 2008/11. London: Ofsted.
- Resnick, Lauren B. 1987. "Learning in school and out." *Educational Researcher* no. 16 (5):8.
- Schwarz, Mary, and Karen Yair. 2010. *Making value: craft and the economic and social contribution of makers*. London: Crafts Council.

- Sen, Amartya. 1992. *Inequality reexamined*. New York: Russell Sage Foundation.
- Shannon, Michael. 1990. "Towards a rationale for public design education." *Design Issues* no. 7 (1, Educating the Designer):29-41.
- Stables, Kay. 2010. The Inspiration Pitch: Where do design ideas come from? In *The Design and Technology Association Research Conference 2010*, edited by David Spendlove and Kay Stables. Keele University: The Design & Technology association.
- Stables, Kay. 2012. Designerly well-being: Can mainstream schooling offer a curriculum that provides a foundation for developing the lifelong design and technological capability of individuals and societies? Paper read at Technology Education in the 21st Century, at KTH, Stockholm.
- Stables, Kay, and Richard Kimbell. 2000. "The unpickled portfolio: pioneering assessment in Design and Technology." In *Design and Technology International Millennium Conference*, edited by Richard Kimbell, 195-202. London: The Design and Technology Association.
- Yair, Karen. 2011. *Craft and Wellbeing*. London: Crafts Council.