Designerly Well-being: Implications for pedagogy that develops design capability

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Abstract
This article presents the concept of "designerly well-being", identifying the value for individuals and society of the development of the design capability inherent in all humans. The concept builds on ideas more generally of capability, well-being and democratic design and is characterised as the satisfaction, pride, confidence and competence of being able to engage in designerly thought and action with criticality and capability. (Stables, 2012) This article 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. An initial exploration of designerly well-being is presented through a small-scale pilot study that enabled 14 year olds to work in groups to take on big design challenges and prototype ideas. The pilot study indicated the positive effects on both the learners and the learning that took place as well as providing insights into the challenges for the teachers. It also indicated the need for further research.

Key words
designerly well-being, design pedagogy, design education research

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 and 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 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 (Hirst, 1974; Lewis 1996) has dogged general education throughout history – providing a 'top down', assessment-led model of education that has seen schools sometimes providing a "watered down version of professional training" (Baynes 2010, p.28) 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 debate has seen a reaction against this with calls for more interdisciplinary approaches (Buchannan, 2001) that enable design's broader contribution through big design – designers working in multidisciplinary teams to address big issues, such as 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 enables people to be critical consumers and users of the designed and made world. This sentiment can be seen in 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)

Or that from the European Design Leadership Board

> A raised level of design literacy will ensure future generations of more informed consumers and will contribute to a more conducive climate for Europe's future entrepreneurs and innovators driving jobs and growth. (Thomson & Koskinen, 2012, p.66)

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 article 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 and a small-scale research project that is the first step in exploring the concept through a school design project.

Capability, well-being and designerly well-being

The relationship between design and well-being is increasingly being explored to good effect through academic research and professional design, where the emphasis is on effective ways for designers to engage in participatory design to produce products that support the well-being of others. This might focus on those 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 designed to support well-being in others, 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. I propose that such activity promotes the well-being of the individual through the process of designing.

This idea 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. This idea is echoed in the writings of the ecologist Thomas Princen through his statement that

"Humans are at their best when
1. they are faced with a genuine challenge;
2. they are creative and productive;
3. they find meaning in their own problem-solving and impacts larger than themselves;
4. they help themselves and help others;
5. they self-organize and self-govern;"

(Princen, 2010, p.175)

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 seemsomewhat 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.

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Designerly well-being and democracy

If all humans have design potential, then the way that this potential is realised raises importance 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.

While Baynes is an advocate for developing the active capabilities of designing through imaging and modelling 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 marginalised.

> 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 it is also important in considering the more tangible, visceral dimension that comes 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 the 'Making Value' report (Schwarz and Yair 2010; Yair 2011) the breadth of ways in which craft practices and craft practitioners contribute to human well-being are highlighted. 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'. The current growth in interest in hands-on learning 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. This raises the question of the appropriateness of pedagogic models currently being used in many school projects. Often highly structured around the development of skills, much in-school project-based learning looks quite different to examples provided by the likes of TED talks by people such as Emily Pilloton, Gever Tully and Sugata Mitra, all demonstrating the power of

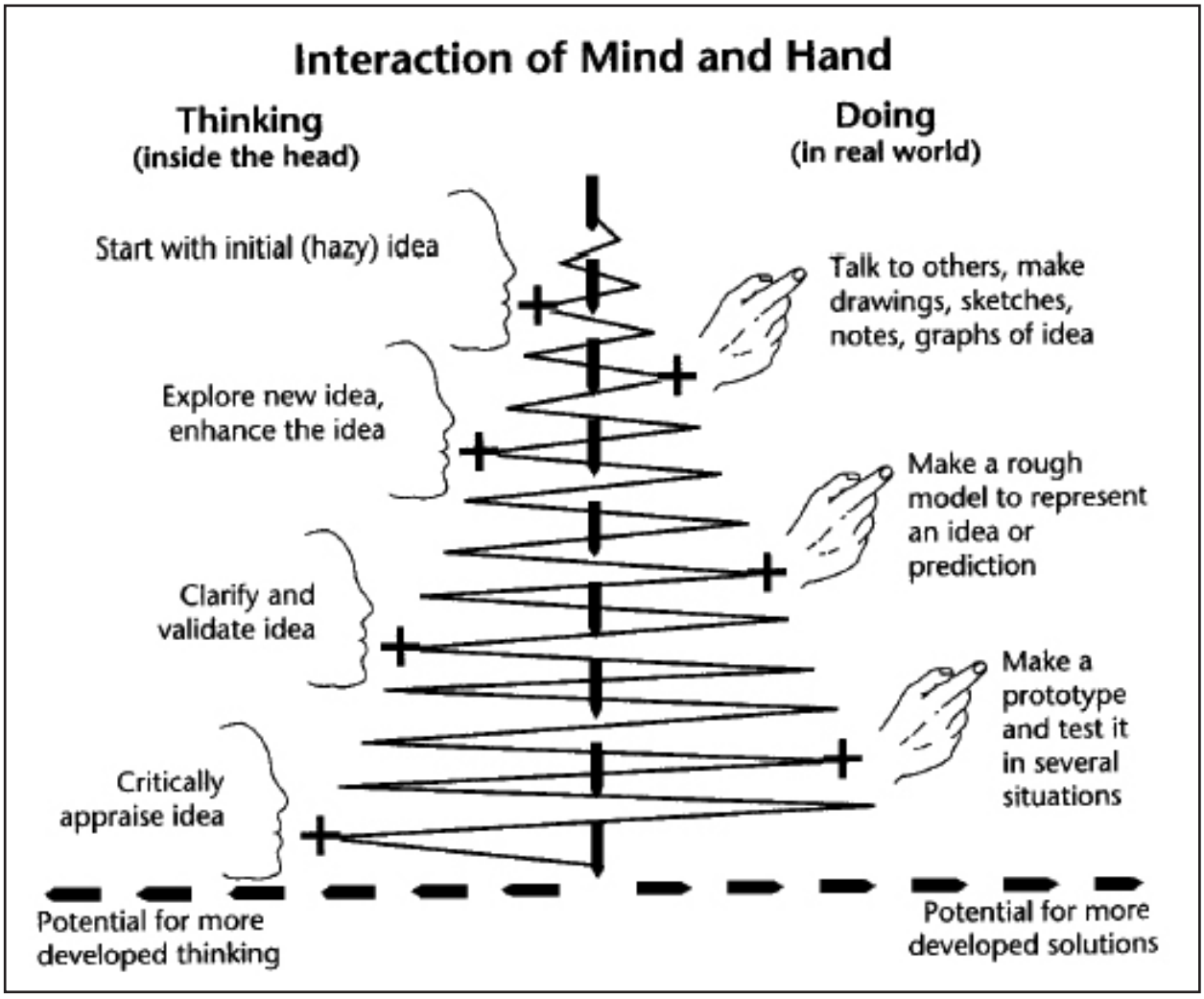

Figure 1. The APU Design & Technology model of process (Kelly et al. 1987)

learning in less formulaic situations, and often outside of formal education. These perspectives have resonance with Lauren Resnick, writing more than 25 years ago, when she articulated 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)

Over the last 25 years in the Technology Education Research Unit (TERU) at Goldsmiths we have explored new approaches to supporting design activity in learning situations. The context of the research has often been on learning and teaching to enable assessment of capability and through this certain critical aspects of learning and teaching have been highlighted. Each of these also has some bearing on developing designerly well-being. What follows is an articulation of these aspects and an account of related pedagogic issues and approaches the research provoked.

Views of processes of designing

Through research undertaken in the 1980s (Kimbell et al., 1991) we highlighted the importance of 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.

The model was developed empirically and validated through an analysis of 20,000 short design activities undertaken by 10,000 fifteen year old learners. The research allowed us to profile ways in which learners approached the processes of designing and to see how these approaches impacted on their performance. 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. But beyond these profiles we found that there was no uniform process to be witnessed. This challenged the orthodoxy of a single, linear view of process (identify a problem; research; generate an idea; make it; evaluate it) and in turn challenged teachers' pedagogy based on using the linear model to manage the teaching and assessment. We 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). We also became aware of how the iterative and more individualistic model supported individual learning styles and 'designing styles' (Lawler 1999, 2006).

The centrality of imaging and modelling ideas

The research also raised a question about what drives the process of designing if not a pre-specified linear set of steps. The initial research indicated that the lynchpin was the growth of ideas or, what we have qualified by more recent research, the 'having', 'growing' and 'proving' of ideas (Kimbell et al. 2004) at any stage of a design project where an idea 'sparked' (having); where the learner took the ideas (growing) and how they made decisions about its development (proving). This research also indicated the fundamental importance of learners engaging with materials and making while they modelled and developed their ideas. The research threw up further challenges to pedagogic orthodoxy in schools – that ideas (often represented by drawing 4-6 boxes and putting an 'idea' in each one) came *after research* and *before making* – an orthodoxy that was disputed by the outcomes of our research.

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 frequently 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. In more recent research (Mclaren 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)

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Structuring activities – choreography not management
Having created a model to characterise the processes of designing, we also found that we had a provided a framework for structuring activities that presented an alternative to the prescriptive, management focused, linear model. In creating the framework we have been mindful to take our lead from the iterative model, anticipating that designing begins with an initial spark of an idea and that learners are then prompted through a series of active and reflective "sub tasks" designed to scaffold their designing in a responsive (rather than prescriptive) way. 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 design 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.

Throughout our research we have collected data on the response of both learners and teachers 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, we have used mobile technologies that allow learners to draw on a range of text and imaging tools to develop their ideas, with all drawings, photos, videos, audio files, text files being synchronised to a digital portfolio. This shift 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 in the context for designing
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, p.115)

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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.

To begin to explore the challenges and potential for both learners and teachers, a small pilot study has been conducted in which learners were undertaking design challenges in contexts that they had identified as having social and cultural relevance (Stables, 2013). The pilot involved 3 teachers and 46 Year 9 learners (14 year olds). It was structured through an initial questionnaire to the learners that enabled identification of arenas for designing that they felt had social and cultural relevance and that they were motivated by. Drawing on a list of 30 potential contexts for design projects, the questionnaire collected their views and interests on design challenges that spread from helping achieve world peace to designing transportation systems for the future and designing that addressed issues of climate change. Based on the results of the questionnaire, teachers planned a one-day design challenge. The learners worked in small groups, structured to align with the topics they had shown interest in from the questionnaire. The context was set through an overarching theme of empathy and then broad references to future systems and lifestyle, both presented through thought-provoking image boards (see figure 2). The learners were encouraged to set their own scenario, based around casting forward into the future to imagine their lives in ten years time and back-casting to the present day in developing a more focused brief. The day was fairly loosely structured, iteration between learners developing and modelling ideas and presenting and critiquing these ideas with others. Their task was to create a workable concept and prototype by the end of the day.

Alongside the design project learners were also asked, periodically, to identify how they were feeling about what they were doing by selecting from a range of emoticons and then explaining their selection. In addition, at the end of the day they completed a questionnaire, which provide evaluative feedback on the day.

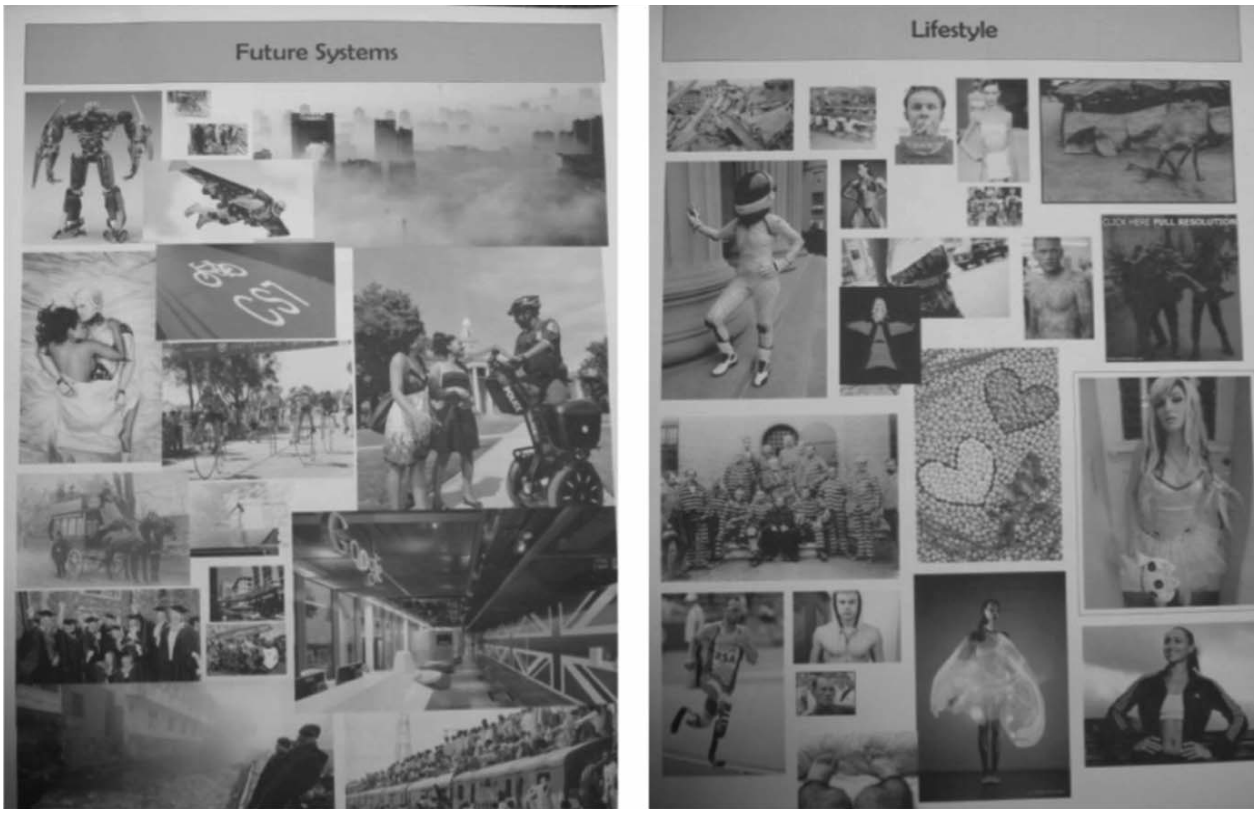

Figure 2: Image boards for Future Systems and Lifestyle

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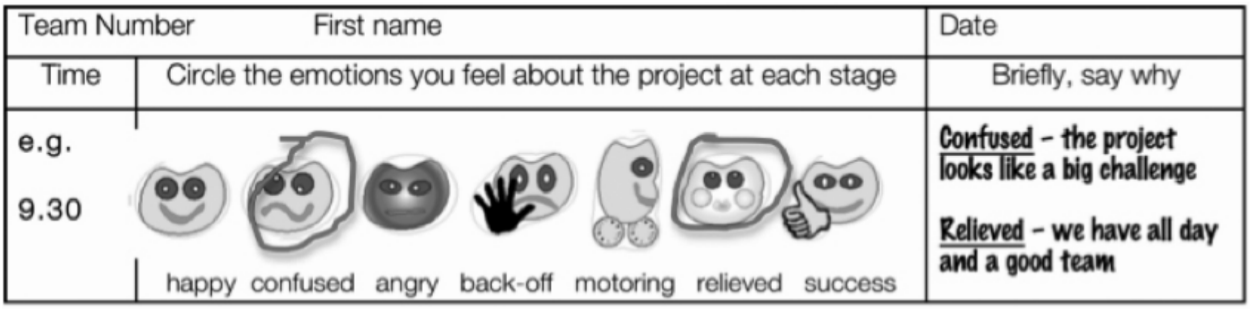

Figure 3: emoticons to record emotions whilst designing

The learners were very positive about their design experience through the one day activity. Of particular note in respect of designerly well-being there was very strong agreement about the importance of allowing the learners to choose the design topics, how proud they felt of their achievements, how much they felt that they had been making their own decisions and how rewarding it was to take on big design challenges where they could make a real difference. This response from the learners shows some interesting parallels with the findings identified early by Claxton et al (2012) that focused on building learning power through a 'studio teaching' methodology. It also indicates how the learners' experience resulted in feelings not dissimilar to those in Princen's list of when "humans are at their best" (Princen, 2010, 175)

Using the emoticons was a first attempt at capturing the emotions that learners experience when designing and this was greeted with a mixed reaction. However, some learners very much liked being able to explore and record their emotions and the profiles do provide some interesting insights – as can be seen by the contrasting selection shown in table 1.

	After introduction	Before break	Mid morning	Before lunch	Mid afternoon	End	After voting (learner initiated)
GROUP B Learner 5 (boy) (emoticon score = 2)	**Confused, Back Off**: *Don't know what we are doing, bad mood.*	**Back Off**: *Bad mood.*	**Happy, Motoring, Relieved**: *Good mood, going well, good idea.*	**Happy, Motoring, Relieved**, *Success: Everyone good.*	No comment	**Happy, Relieved**: *Our project went well, its over.*	**Happy, Relieved, Success:** *We won.*
GROUP C Learner 4 (girl) (emoticon score 4)	**Confused**: *Not very sure how it's going to go. Or exactly what to do.* **Happy**: *I like the topic our group has.*	**Happy**: *Getting good ideas and thoughts.* **Relieved**: *Getting somewhere - designing what we are making.*	**Happy**: *Doing well starting designs.*	**Happy**: *Designing on computer.* **Motoring**: *Moving forward.* **Confused**: *2 girls taken the idea - what do other 2 do ...?!*	**Happy**: *Going really well, finished a lot.* **Motoring**: *Done a lot - moving forward fast.*	**Happy, Motoring 'half Success'**: *Really complete - only to present.*	
GROUP D Learner 1 (boy) (emoticon score = 1)	**Motoring**: *Ready to start!*	**Motoring**: *Continuing.*	**Motoring**: *We've gotten the ball rolling.*	**Back Off**: *Project building is slowing down.*	No comment	No comment	

Table 1: illustrations of the variety in use of emoticons

To gain insight into the challenges and the response of the teachers to planning and managing the day, recordings of planning meetings made and a group interview was undertaken that focused on their reactions to the experience. From the planning meetings it was clear that the teachers were both apprehensive and excited about the challenge the day presented and were particularly concerned that not all of the learners would engage with a broad and challenging brief. They were concerned with the pragmatics of structuring and resourcing the day, but also keen to be as open and supportive as possible to allow the learners to take control of the development of their ideas. After the event the confessed to being amazed at the level of maturity shown by the learners, impressed with the seriousness

and commitment shown and unequivocal about the learning that had taken place during the day.

The pilot was small scale, and was undertaken as a 'special event' – not in timetabled, weekly lessons, so it leaves many questions still to be explored. But it did illustrate the positive effects of structuring design activity that did enable learners to have the satisfaction, pride, confidence and competence to engage in designerly thinking and action, with criticality and capability.

The collective research conducted over the years in TERU has focused on pedagogic approaches that support learners to understand their own processes and, through metacognition, develop their own ways of bringing designerly thought and action to bear on design challenges. Our concerns have resonance with many learner-centred views of education. But even if adopted more broadly, would they, in themselves, develop designerly well-being? The pilot project has provided a starting point to explore this, 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, but immensely worthwhile.

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