NARRATIVE IN DESIGN DEVELOPMENT

Peter R N CHILDS[1], **Ying ZHAO**[2] **and Joanna GRIGG**[3]
[1]Imperial College, London
[2]Beihang University
[3]Royal College of Art

ABSTRACT
This paper describes the value of narrative used with ideation tools in aiding the rapid production of product concepts and designs for masters students of graphics, fine art, product and industrial design. The ideation tools used alongside narrative included elements of divergent and convergent thinking in combination with reverse engineering and functional analysis, and practical prototyping using a range of readily adapted artefacts. Narrative was introduced and used by the students in order to ensure the development of a context and purpose for the product, artefact or system developed or proposed and to stimulate original product concepts, ideas and thinking. The concept of narrative is familiar in design. Here however the concept was reinforced using structures associated with fictional narrative. Reverse engineering exploring the deconstruction and identification of function for each component in a product was used to aid students ensure practicality in their idea implementation. This paper describes positive experiences resulting from this activity, with a particular focus on the value of narrative in developing robust concepts. The use of physical prototyping provided tangible and instant feedback for divergent and convergent phases of idea development.

Keywords: Design, narrative, education, functional, attributes, reverse, engineering

1 NARRATIVE AND DESIGN

From evidence of cave paintings and drawings by Neanderthal and Homo sapiens 40,000 years ago to the present day [1] the relationship between mankind and narrative can be seen as intrinsic and longstanding. Evolutionary psychologist Sugiyama states: 'the practice of storytelling is ancient, pre-dating not only the advent of writing, but of agriculture and permanent settlement as well' [2]. Narrative can be loosely defined as a story, which is a sequence of events involving characters [3]. This definition may be refined to suit the requirements of various domains. For the purposes of this paper, narrative can be considered synonymous with story. Where in fiction 'character' has a specified meaning, in other domains this may be substituted with symbol, environment, or other. Intrinsic to these definitions is the temporal nature of narrative – a sequence of events that occur over time.

In the present day, Sugiyama states, 'all known cultures … practice storytelling' [2]. As available media have developed to include electronic media, of all types, we have not let go of narrative. Indeed, it suffuses our culture, with advertisements on television forming short narrative scenes; social networks such as Facebook require users to display their personal narrative on a 'Timeline'; fantasy worlds abound. Documentary and other forms of non-fiction engage large audiences, with popularity of the biography and biopic an indication of our need to reflect on other peoples' lives, or personal narratives. In an era where many cultures experience less-limited technology and resource, narrative remains central.

Narrative has a number functions within an individual, culture, and society. Philosopher Paul Ricour states: 'it is in narrative that the search for coherence … finds its first articulation.' and through coherence, identity [4]. Within individuals, healthy psychological development is dependent on being able to understand, then be content with, our personal narratives [5]. Within society, narrative underpins the meaning of civilization. Narrative can be said to link imagination and creativity [6], both of which are intrinsic human qualities. Research into creativity and creative methods is underpinned with the use of narrative. What is group brainstorming other than the development of a story in the grand old tradition, around a fire (easel), orally (then onto post-it notes), drawn to a conclusion; what

is de Bono's Six Hats technique [7] but a story told by different 'characters'? Both processes provide new insights for participants and observers.

Narrative has long been considered intrinsic within design process. Blaylock defines it in this context as something 'that conveys the meaning of an idea, person, or event through the description of a form, space, light, colour, texture, or scale. The narrative is not a literal representation of what something is physically, but rather what it means to be' [8]. In design, the term narrative may be used in a broad sense to convey not solely a story of characters over time but to include the entire setting of a proposed or designed object – such as the 'feel' of the object, its qualities, provenance, and the personality and situation, profile and understanding of potential users. This sense of narrative within a designed object gives it depth and attractiveness that objects designed without such an understanding and development may lack. This subversion of the term 'narrative' distracts from the primary process of telling a story simply in order to create, and this is what current pedagogic sessions are serving to reinvent, though retaining the need for the designed output to have this sense of felt narrative within it (see Figure 1). By using the term 'narrative' in its literal sense, designers have the opportunity to move closer to the user within stories, and therefore to develop a product or system with greater user appeal.

Figure 1. (a) Felt narrative emerging through group storytelling. (b) Pitching the concept using oral storytelling alongside visuals

Furthermore, when narrative moves away from the closely defined characters of product/user and instead allows the designer to create any narrative, in any context, as part of the design process, increasingly novel outputs can be found. Clearly, if no reference is made to product or user there will be no end product of worth in designers' terms, and the brief is not fulfilled. Therefore the narrative is created broadly around an area of the market that the designer wishes to investigate. Characters can be from memory or developed, and short scenes around the topic are storyboarded. A series of narratives 'that have value to the designer/design group' is developed. This value later reflects in both the generation of new ideas and the increased resonance of the product or system devised. Remembering that narrative is by definition temporal, designing via narrative brings more to a design than the 'snapshot' of a user viewing an object in one temporal dimension. Where narrative is intrinsic within the product's design, an ongoing temporal sense, received as a greater sense of completeness and user recognition, is found. As Tully states: 'The story allows us make sense of and construct meaning around our needs. For the designer the story enables the construction of empathy and emotion ...' [6].

2 NARRATIVE IN NON-LINEAR DESIGN

Design processes abound and have been widely documented, with many design schools developing their own brand of approaches. Commonly cited methods include the educational approach CDIO (conceive, develop, implement, operate), total design, double diamond, six sigma, MDO (multi-objective design optimisation), and gated reviews. It is widely recognized that experienced practitioners approach design in a different manner to novice designers. Hall and Childs [9] note the non-linear approach apparent in the education model for the Innovation Design Engineering masters programme at the Royal College of Art and Imperial College London. As highlighted by Hall and Childs, one of the linear mythologies inherent in industrial design is that students study a range of core modules, which they are then expected to 'assemble' in a final project to show mastery of their

discipline. Such an approach tends to reinforce a 'do-this' and then 'do-that' culture. The non-linear model however creates a context for innovation via methods which are elicited from 'within' the student rather than imposed from without, and delays the presentation of overt systems until students have a design model against which this can be tested. It deliberately avoids convergent tutoring styles.
Similarly with narrative, although 'there is a tendency to conceive of narrative in terms of what was assumed to be the conventions operating in 19th century realist fiction,' [10] in fact narrative provides a vehicle where 'beginnings do not constitute definitive origins, development is never seamlessly continuous (as transitions are inevitably disjunctive) and endings do not provide definitive closure'. Using this 'percussive' narrative approach, alongside the non-linear design approach of Hall and Childs [9], opens the designer's mind, and 'allows', instead of closing down and limiting.
Within this context an intensive module in ideation and concept development was formed and delivered in the School of New Media, Art and Design at Beihang University, Beijing. The module was delivered to a combination of graphics, fine art, product and industrial design masters students. It included lectures and seminars on narrative and design, concepts around the mind and the nature of thought, ideation and creativity tools, and an exposure to a major futures project as an example of collaborative design [11]. The module's two prominent modes were specific focus on physical prototyping alongside the development of a narrative as a means to assist in idea development. This is described further in Section 3, and culminated in groups pitching their ideas to a diverse audience of students and tutors, academics, entrepreneurs and the general public.
Each of the lectures and seminars was specifically framed in order to assist the students in ideation through narrative and other techniques, and in developing their ideas. The seminars on creativity involved exposure to and practise of a range of creativity tools including grid brainstorming, six hats morphological analysis and creative visualisation. A particular outcome of these was the importance of permission-giving during group ideation, enabling generative behaviours and improving the robustness of a concept. An overview of the lectures and seminars is given in Table 1.

Table 1. Themes of module seminars and lectures

Creativity tools	Introduction to a range of widely used creativity tools, their principles and practical use.
Innovation and design	An explanation of recent projects from Innovation Design Engineering masters programme plus summarised histories for each project.
The mind: Freud	How ideas come from the unconscious, how to facilitate this, and how to capture them when they do.
The mind: Jung	Archetypes and multiplicity – the different personas or characters we can assume during the process of idea generation.
The mind: Winnicot	Finding a safe place in the mind to take risks, 'play', and to develop and consider ideas.
Narrative	Concepts around narrative. Narrative as intrinsic to the human condition.
Narrative and design	'Design as narrative' and 'narrative design.' Using narrative as an ideation / idea development tool. Narrative in pitching (see Figure 1).
Futures project	Exposure to a major futures project with Airbus on the design of future aircraft cabins. (see Hall et al. 2012)
Reverse Engineering	Considering the functionality (technical, aesthetic, economic) for each component for a specific product sourced from local market Jinwuxing

Oral narrative was used as a tool in group workshop sessions. In oral storytelling, each teller brings their own interpretation of a tale. They also bring their own flavour in the way the tale is delivered – straight and unenhanced, or lengthy and embellished. As a form of group brainstorming, a task of notional movie-making within an unlimited setting and duration was found to capture each individual designer's personality and ideas which became part of the group's proposed narrative. By using 'the movies' as an example of where narrative is found, students could conceptualise the premise of a narrative built along a broad theme that jumps around temporally, encompasses any relevant (or indeed irrelevant) items, and in the first place needs not reach a conclusion. Narratives that can be built as a series of short scenes around a topic or question do not need any definite form during the ideation stage. Thinking 'design' was discouraged in order to allow the imagination to sketch

narratives without prescription or boundary (within those based on practical constraints). This allowed the collective mind not only a quantitative outcome (the number of ideas brought forward) along with a taxonomy of those ideas, but also a qualitative outcome in the widely different 'flavours' of those ideas. Taken forward into storyboarding while the group was still in session by a scribe able to sketch the ideas plus a second scribe taking written notes, this flavour was captured and used within the ensuing group narrative and later fed into the final group output. So the narrative began to build. The seemingly disparate range of lectures and seminars were pulled together in workshop sessions, the collated range of tested processes forming a design whole.

3 PHYSICAL PROTOTYPING AND MOCK-UPS

Students were asked to deconstruct an electrical device and lay its components out to view, and identify the function or functions of each component (see Figure 2). For this stage design groups were teamed with engineering postgraduate students. Within the context of the group narrative, one component from the deconstructed device was chosen and incorporated into their ready-storyboarded 'movie' in some way. Participants were encouraged to find any interesting way of placing the component/new design within their narrative. A new group design was thus imagined around the component.

Figure 2. Reverse engineering process

Tully [6] describes how one group of students were 'actively discouraged from using computer aided design, drafting or modelling tools. The focus on hand generated methods was primarily to encourage a more 'honest' exploration to engage the imagination of both the student and their intended audience.' Similarly, participants in this study, when asked to build their new design from the range of materials available (see Figure 3), began to gain confidence in, or to question, their design's sense and viability. The use of three dimensional manual construction, of holding and feeling the developing object, allowed some ideas to evolve into objects that would now or in the near future be considered viable for current living.

Figure 3. Some of the wide range of workshop materials, and a mock-up prototype

This is demonstrated by two examples. With 'Flying Lamp' students storyboarded a lost person navigating through space looking for home; they also reversed engineered a table fan, placing the blade component into the story's spaceship. Following peer and student feedback during critique sessions the concept was realigned to become a flying lamp for a living room. Every 24 hours the lamp relocated automatically onto pre-installed landing plates. The lamp also responded to clapped commands to alight beside a chair, providing a reading light. A second example, 'Subway Spectacles', originated with the storyboard of an underground-tunnel jungle scene containing luxuriant plants and flowers. A reverse engineered hairdryer case was placed within this scenario becoming a subway carriage. In order to see the luxuriant foliage within dark tunnels a thermal imaging or image enhancement goggle was designed. The design developed through the use of critiques to become multiple pairs of spectacles allowing virtual conversations or parties held within the subway carriage to counteract the isolation sometimes felt in that environment.

Within this disjunctive design process, temporality was confused both via the movie's diverse narrative scenes and within workshop processes involving a series of seemingly unrelated activities. The designer could not 'forward think' to a clever design solution but needed to trust to the process, allowing free ideation. In parallel, participants' mode of thinking was moving from deductive, with the deconstruction of the electronic object, to narrative, with the creation of the movie fantasy, and back. This juxtaposed the logical mind with the abductive mind towards a new range of design solutions. The use of physical prototyping allowed sensible refinement of the design, and more free-flowing thought based on the actuality of holding the designed prototype-in-progress.

4 DISCUSSION

Narrative, as an intrinsic part of human thinking, is normally present in design process unless it has been 'taught out'. Hall and Childs [9] discuss how traditional design education has to some extent been responsible for the 'closing-down' of designer's thinking, rather than its opening-out. Porter and Sotello [10] and Tully [6] agree. Jiang argues that 'group discussion not only makes thinking active and interesting but also arouses excitement and spurs imagination and inspiration of students, which in turn endows their design in process with rich creativeness' [12]. Wu's study indicates that group discussion when employing divergent and convergent thinking can open an unlimited imagination and can finalize a concept and design [13]. Participants in the current study found that when permitted to 'fly into fantasy' through unconstrained group storytelling, outputs were innovative, possessed a true 'felt sense' of design narrative, and in some cases concepts were of a level to be developed for market. Students in the study enjoyed the storytelling process, and their design and production process was also found more time effective. Use of physical prototyping was even more productive because of its tangible and instant feedback for divergent and convergent phases of idea development (Figure 3).

As Brandt [14] says: 'Even though most students initially respond to the idea of narrative on an intuitive level, it seems throughout almost all projects something intriguing takes place when narrative starts to be adapted as a design tool, an exploration and tactic.' Tully [6] found that at 'pitch' stage the quality of visual presentation from students was lower than would normally be found in students at that level, due to having no access to standard design visualising and making tools. However, 'the quality and depth of concept was substantially better. Their understanding of their own process was improved and their confidence in communicating the qualities of their concepts improved.' This was recognised in the current study, with prototype development being limited, but design and function clearly apparent in these built objects.

It is not a straightforward matter facilitating sessions involving so many strands of theory and practice. Many barriers need overcoming, in particular where concepts are complex, and where students are being taught in a language that is not their first language. However, though complex, none of the concepts involved here are 'difficult' conceptually; they are understandable across cultures due to the human predisposition to tell stories, to create, to layer meaning, and to process diverse strands simultaneously. Thus, in the small number of instances where the lectures and seminars preceding the workshop sessions had seemed too complex to allow participants to feel 'safe' in exploring the process, overall concepts and a simplified process were explained, and participants were in all cases able to re-engage. This is remarkable considering the short timeframe and non-native language of session delivery. Where similar concepts and processes are used longer term in design education (such as described by Hall and Childs, [9]) extremely positive outputs have been noted.

5 CONCLUSIONS

'Two functions of narrative are especially common in educational discourse: coercive narratives and emancipatory narratives. The former are persuasive and seek to constrain belief; the latter are expressive and offer processes for creating new meanings' [15]. A designer wants to create new meanings, not be constrained. To enable this, design processes need to be outward looking, opening up, with divergent boundaries. The use of logical, deductive thinking is useful at some stages of the design process. At concept and ideation stages when working towards truly original concepts and design, however, thinking needs to be abductive: designers must be able to conceptualise without the constraints of engineering, markets, and the perceived judgements of their peers and tutors. Narrative, teamed with three dimensional design and physical prototyping, is an effective means of putting the designer's mind into this way of thinking, because:

- in storytelling anything is possible;
- with 3-D design the loss of temporality and standard process allows entirely innovative thought;
- in prototyping with their hands, participants draw the whole together sensually, developing those 'intuitive', though in reality learned, skills of sense, balance and appropriateness.

REFERENCES

[1] Pike A. W. G., Hoffmann D. L., García-Diez M., Pettitt P. B., Alcolea J., De Balbín R., González-Sainz C., de las Heras C., Lasheras J. A., Montes R., Zilhão J. U-Series Dating of Paleolithic Art in 11 Caves in Spain, *Science*, Vol. 336, no. 6087, pp. 1409-1413, 2012 .

[2] Sugiyama M.S. Narrative Theory and Function: Why Evolution Matters. *Philosophy and Literature*, Volume 25, Number 2, pp. 233-250, 2001.

[3] Jahn M. Narratology: A Guide to the Theory of Narrative. English Department, University of Cologne. N1.2. Available: http://www.uni-koeln.de/~ame02/pppn.htm [Accessed on 2012,1 October], 2005.

[4] Askin R. Mneme, Anamnesis and Mimesis: The Function of Narrative in Paul Ricœur's Theory of Memory. *The Journal of the International Association of Inter-American Studies,* Volume 2.1, 2012.

[5] Dennett D. C. The Self as a Center of Narrative Gravity. In: Kessel F., Cole P., and Johnson D., (eds.) *Self and Consciousness: Multiple Perspectives.* Hillsdale, NJ: Erlbaum, 1992.

[6] Tully R. Narrative Imagination: a Design Imperative. *Irish Journal of Academic Practice*, Volume 1, Issue 1, Article 8, 2012.

[7] de Bono E . *Six Thinking Hats: An Essential Approach to Business Management*. (Little, Brown, & Company, London), 1985.

[8] Blaylock J. Incorporating Narrative into Beginning Design Solutions, Unstaked territory : frontiers of beginning design. In: *Proceedings of the 19th National Conference on the Beginning Design Student,* Oklahoma State University, Stillwater, Oklahoma, April 3-5, 2003.

[9] Hall, A. and Childs, P.R.N. Innovation design engineering: non-linear progressive education for diverse intakes. Pp. 312-317, In Clarke, A., Ion, B., McMahon, C. and Hogarth, P. (Editors) Proceedings of the 11th EPDE International Conference, 2009.

[10] Porter L. and Sotelo S. Design by Narrative, In: *Propuesta Aceptada Para el Congreso Interncional IERG*, Simon Fraser University, Vancouver, 2004. Referencing Rakatansky M., Spacial Narratives. *The Harvard Architecture Review*, 8, Rizzoli, 1992.

[11] Hall, A., Wuggetzer, I., Mayer, T., and Childs, P.R.N. Future aircraft cabins and design thinking: Optimisation vs. win-win scenarios. Paper ISJPPE-2012-F0077, 4th ISJPPE Conference, Xi'An, China, 2012.

[12] Jiang, Ke. Study of Training for Creative Thinking. *Proceedings of the 2007 International Conference on Industrial Design(Shenzhen, China),*Volume 1/2, Page 136,2007.

[13] Wu, Guoqiang. On Design Thinking : Study of Teaching Model for Industrial Design . *Journal of Nanjing Arts Institute,* Volume 1, Page 132,2005.

[14] Brandt S. Narrative Design: Meaningful Places for People. A Study on the relevance of Narrative in Spatial Design Education. In: *IASDR conference (International Association of Societies of Design Research),* 2009.

[15] McEwan H. The functions of narrative and research on teaching. *Teaching and Teacher Education,* Volume 13, Issue 1, Pages 85–92, 1997.