14.0 DESIGN ANTHROPOLOGY

By Jamie Wallace

ABSTRACT
The review of Design Anthropology and Design Research for REELER project is a selected view based upon how these fields of study can contribute to the project seen from the current perspective. As many of the wider methodological intentions have already been outlined in the project application, the scope of the review will be mainly upon the means and methods through which REELER findings can be made appropriate to the design activity of Roboticists (the Road Map) through the application of Design Anthropology. To a lesser extent, the Review is intended as a support to the understanding of how Roboticists are currently conducting design with stress upon how this can be beneficial to the former.

14.1 Opening

Design Anthropology is an emergent field (Clarke 2010) at the intersection of human and design activity. An integration of anthropological and design understanding is used to consider how design influences human interaction, how this can be reconsidered, and how it can be put to use within design work itself. Aligned closely to the humanistic inquiry of design studies (Margolin 1998), rather than the objective and systematic approach of design science (Archer 1981), concerns range from: skilled practice and "the design of technologies that build upon and enhance embodied skills"*1*; how "design helps define what it means to be human, that diversity of human values, and then how design translates these values into tangible experiences" *2*; along with the "speculative imagination of possible futures"*3*. This focus upon the human within design relies upon the use and development of anthropological approaches allowing an "emphasis on .... ethnographic methods for a humanist kind of design that accounts for the lived cultural worlds inhabited by designed things and their users" *(Murphy & Marcus 2005, 252)*. At this stage it is unclear the extent to which this kind of emphasis plays a part in the design of robots, however it would seem reasonable to assume that a design anthropological approach as outlined would increase the likelihood of unearthing, and setting into action, ethical concerns about robotics.

Design Anthropology shares a set of interests with and number of fields such as material culture and some sub fields with Design Research such as Participatory Design. Participatory design's relevance to Robotics can be seen in an example by Frennert et. al. in which a robot mock-up was used with a group of implicated users to consider the design of assistive robots for the elderly (Frennert, Eftring, & Östlund 2013). In this case the issues was one of designing a robot that would be adequately 'accepted' by older people and focused upon researching into the informants beliefs and opinions related to aging, interaction with the robot, and aspects of aesthetics.

---

1 University of Aberdeen / Southern Denmark, PhD course in Design Anthropology http://gottesman.pressible.org/todd/design-anthropology-a-resource-guide

2 Swinburn University, Design Anthropology MA program, http://gottesman.pressible.org/todd/design-anthropology-a-resource-guide

3 Aberdeen University, MSc Design Anthropology: http://gottesman.pressible.org/todd/design-anthropology-a-resource-

14.2 Methodology

This review was built from the qualitative approach described in the General Methodology (see section 2.2 Qualitative approach), drawing on the REELER researcher's extensive knowledge in the fields of design and design anthropology.

14.3 Strategies of application

The arrangement of the fields of Design Research and of Design Anthropology into strategies of application provide a useful taxonomy for considering how to scope a review for REELER project.

14.3.1 Design and design research

There is no single definition of what is meant by design research but it is generally seen to follow differing directions whether related to specific problems, general types of problems or fundamental principles (e.g. Frankel & Racine 2010). These lead on to the three categories suggested by Sir Christopher Frayling (following inspiration from a number of others (ibid)): research for design; research through design; and research about design. In other words, research for design would be activity that supports an actual design process such as the design of a robot to pick cucumbers, and might shed light upon the preferred way to handle them. Research through design focus upon the use of design methods such as prototyping to create new knowledge, without necessarily having a good idea of all of the issues before hand. A design approach such as Participatory design follows this paradigm. Research about design is concerned with the nature of design as a discipline and how it is being done. Carrying out interviews with robot designers and users falls within this category. In practice, these directions may be found to inform each other and become intertwined within hybrid methods and individual ways of working.

14.3.2 Design anthropology in three directions

The arrangement of Design Anthropology into three strategies follow similar directions that mirror the relations between the disciplines of design and anthropology (Murphy 2016). These are outlined by Gunn and Donovan (2012) as "Anthropology for Design, Anthropology of Design and Design for Anthropology" (9). Anthropology for Design is as it appears within design research and refers to the utilisation of anthropology in a design process. Anthropology of Design is similar to 'about' design in design research in which design is placed as an object of ethnographic enquiry. Design for Anthropology is similar to Research through Design in which design methods are applied to enhance the practice of ethnography.

14.4 Extending research and enhancing design

In support of REELER methods can be adopted in two direction: through a combination of Research through Design and Design for Anthropology and through a combination of Research for Design and Anthropology for Design. For simplification, this can be termed Extending Research and Enhancing Design

These provide two interrelated strategies for the application and development of methods to develop understanding useful for future interactions between people and designed things. This provides a way to consider the means through which REELER findings can be actively directed within the diverse practices and situated actions of roboticists. The translation of knowledge into methods depends upon contextual factors but also relating to distinctions of human proximity, context of robot development such as within the Industrial or Research sectors and equally notions of Technological Readiness Level.

14.5 Review of methods

The consideration of design methods, whether formalised into a design process, or simply adopted in an impromptu manner, depend upon what is understood by the overall design process. Within fields of design research conceptualisations of design activity appear as descriptive and prescriptive models usually supported by an illustration in graphic form. The exhaustive literature related to design process models varies in relation to differing design paradigms, fields of application and design research (see Dresch, Lacerda, & Antunes Jr. 2015; Dubberly 2004). As these kinds of models are widely used in design and engineering education, in areas of design management and in organisations, they are an influencing factor in the consideration of alternative methods and approaches such as the introduction of ethical considerations in robotics design, organisation and management. Although not strictly prescriptive they influence planning and the discourse and organisation of technical design, design research and design anthropology. One form of design process model could relate to, for example, step by step guides or road models for best practice. Another kind of model is inherent in the notion of technological readiness levels (TRLs) (Menkins 1995) portraying the design process as a staged model with a variable view of risk and maturity as a function of increasing technology development. Design process models originate from the consideration of design as science developed from Herbert Simon and his book The Sciences of the Artificial published in 1969 attempting to systemise and formalise design methodologies. This has since developed through the Design Methodology movement notably by John Christopher Jones (1980) and Christopher Alexander (1971).

Design methods may incorporate traditional research methods, such as observation, interviewing and ethnography, but differ in that they attend to the development and use of designed artefacts and services. This use of methods Extending Research and Enhancing Design pointing to the fact that methods need to enable design researchers and designers to learn particular phenomena and equally to create (Bunge 1980). This can be understood in simple terms of seeking to understand a problem, and then trying to solve it, where both of these aspect require the combination of both theoretical and empirical knowledge. This conjunction of understanding and solving, together with the indication of a process or progression, provides the basis for design process models. This particular coupling of thinking and doing is often considered in terms of analysis and synthesis and appears in early examples of mapping problem-solving approaches such as Koberg and Bagnall (1972). Understanding design as the interrelation between this analytical and synthesis coupling has become well established in models that attempt to mirror the phenomenology of design working such as Bela H. Banathy (2013). Here (fig 1.) relations of exploration and focus are illustrated through notions of cyclic divergence and convergence.

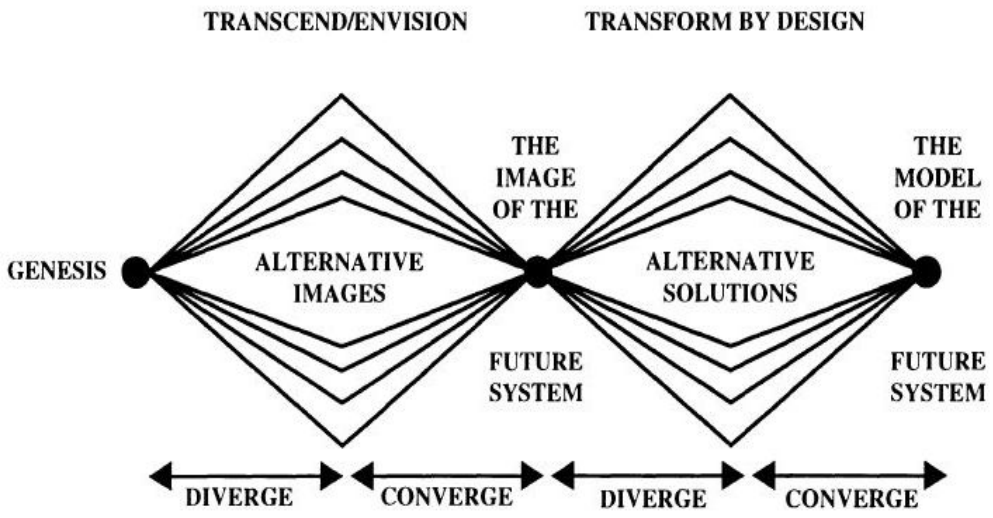
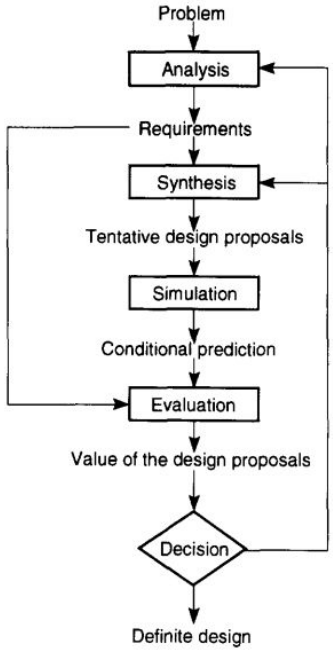


Figure 12 Example - Dynamics of divergence and convergence from Banathy (2013)

Approaches to design process models vary, seeking to stress the reasoning processes of design by presenting relations and complexity between differing types of activity. Design practice is acknowledged as iterative in nature, and includes issues of understanding and development that unfold over time. This leads to the representation of design process through cyclic models in which, for example, evaluation and decision making determine the extent of iteration. This kind of approach is typified by the 'design cycle' suggested by Eekels and Roozenburg (1991, 199).

Figure 13 Example - suggested by Eekels and Roozenburg (1991)



Examples of different issues in the consideration of design processes models include: creativity (Lawson 1991); cycles of action research and reflection (Cole, Purao, Rossi, & Sein 2005); designing as learning (Dubberly & Evenson 2011); the complexities of project management (Doblin 1987); Human-centered design processes (Stewart 1999); innovation planning (Kumar 2004).

Design methods are for the practicalities of planning and doing design, and offer practitioners ways to gain new input, to make issues of the world and their solutions explicit, and to structure their design activity. This may include new ways of managing, collaborating, organising, presenting, researching, making artefacts, and evaluating. These may be seen as providing a more efficient or creative way of working or allowing the adoption of alternative viewpoints. This may include the consideration of contextual data, or perhaps a more human centric or systemic approach. These can range from rational methods providing a structure such as a typology or matrix of issues, through ideas for consideration and decision making, to creative methods able to widen the design space and facilitate imagination and playful collaboration.

In simple terms, drawing is a design method able to inscribe and develop ideas and spatial relationships. This externalaliszing (Cross 1989), in order to aid creative and rational processes is a central facet of design methods. This is typified through other overall methodological approaches such as brainstorming, prototyping, schematic mappings, collaborative games and exercises and visual methods. Alongside these are found the increasing emergence of tangible and playful methods in which exploration and an engagement of things goes hand in hand with for example, tinkering, games, mock ups, toolkits, props, provotypes, scenarios, etc. (Gunn & Løgstrup 2014).

Design Research methods are related to particular design disciplines and paradigms such as engineering design, service design, co-design or design thinking and include strategic aspects. They can be considered as aids to designing, or research into design, and cannot therefore be considered in isolation from the overall design process model. In other words, in general methods need to be conducted or applied at the appropriate phase, or cycle of design process in order for the resulting insights or findings to be applicable or actionable. Otherwise the overall approach will require reconsideration and adaption. In some cases methods follow step by step approaches structuring prescriptive approaches to design and their own inherent design process model (Kumar 2014).

Cross & Roy (1989) offer a typical range of methods within the field of engineering design, providing the following seven methods as a way of spanning the design process:

Objectives tree
Aim: to clarify design objectives and sub-objectives, and the relationships between them.

Function analysis
Aim: to establish the functions required, and the system boundary, of a new design.

Performance specification
Aim: to make an accurate specification of the performance.

Quality function deployment
Aim: to set targets to be achieved for the engineering characteristics of a product, such that they satisfy customer requirements.

Morphology chart
Aim: to generate the complete range of alternative design solutions for a product, and hence to widen the search for potential solutions.

Weighted objectives
Aim: to compare the utility values of alternative design proposals, on the basis of performance against differentially weighted objectives.

Value engineering
Aim: to increase or maintain the value of a product to its purchaser while reducing its cost to its producer.

Vijay Kumar's book titled 101 Design Methods (2012) relies upon a cyclic process model describing modes of planning that recall the iterative and interconnected nature of the design process. Tools and methods are then mapped onto each of these modes. The modes are presented as follows: Knowing the user and context and sensing intent through research; Framing insights through analysis; Exploring concepts and making plans through synthesis, Framing solutions and realising offerings (prototype, pilot and launch) through delivery. The methods allow designers and researchers to collaborate around workshops, activities and mappings that rely upon a human centred approach.

Related to Kumar's approach is that of Kimbell & Julier (2012) who have produced what they call The Social Design Methods Menu intended to provide ways to tackle social and policy issues. Building upon a seven phases process model the methods are intended to "understanding people's experiences and resources on their own terms, taking methodical steps to analyse and address these with their active participation, and pushing for more effective cross-team and cross-organisational working." The methods are described in the following manner:

Find out something unexpected;

Create a story world;

Describe drivers of change;

Storyboarding;

Problem definition;

(Re)defining the proposition ;

Mapping the service ecology;

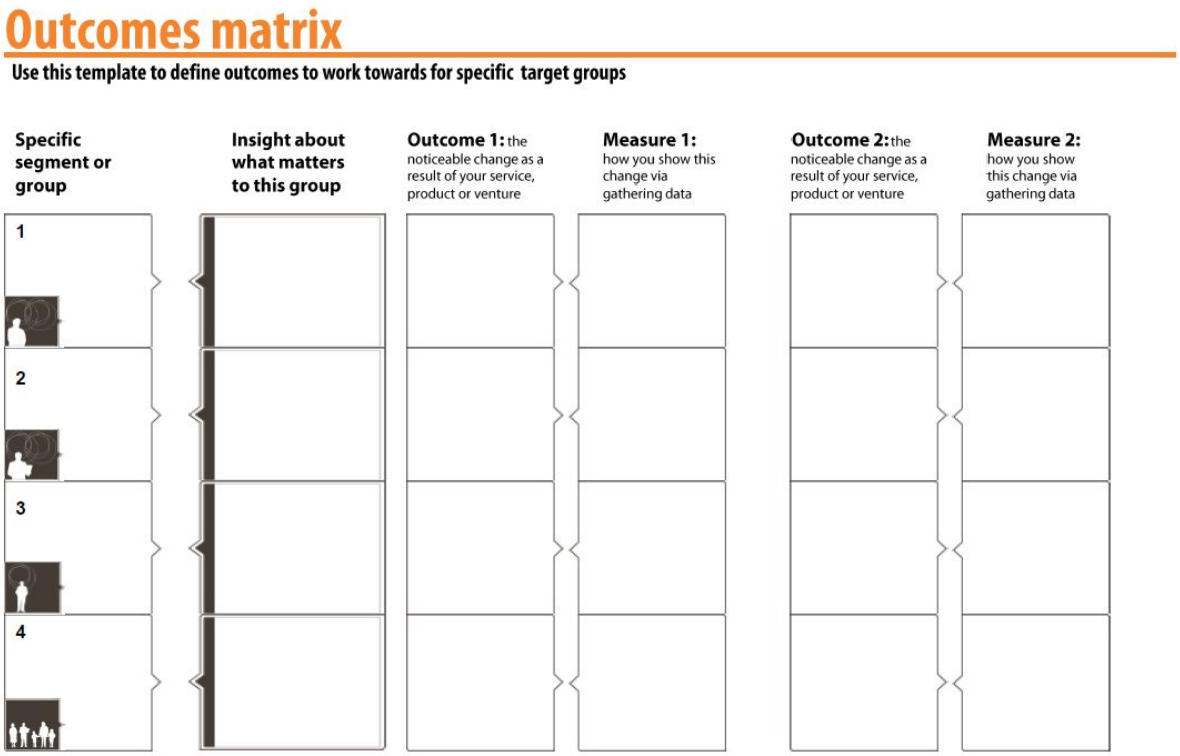
Segmenting by themes;

Sketch a touchpoint;

Plot an outcomes matrix (see fig 3);

Blueprinting.

Figure 14 Example - Outcomes matrix by Kimbell & Julier (2012).



The methods provided by both Kumar, and Kimbell & Julier differ from those of Cross & Roy through a shift from the engineering of products towards user-centered approaches, and the introduction of anthropology and ethnographic practices into design. This shift mirrors the ways certain design traditions are adopting "the tools of social observation as resources for 'local knowledge' that better inform and inspire the development of new ideas" (Clarke 2010, 34).

Characteristic of these methodological approaches is the use of various forms of intervention to develop contextual understanding and employ this in the finding of specific solutions. It is here where the field of design anthropology becomes orientated towards intervention and transforming social reality (Gunn, Otto & Smith 2013) typically through collaborative exercises, and with things between different stakeholders such as users, producers, designers and researchers. From a design perspective, this inclusive orientation has been taken up through the approach of participatory design growing out of Scandinavian traditions of including workplace studies and cooperation within designing activity. Methods within participatory design include simulations of technological use, design games and cooperative prototyping (Bødker 1991; Greenbaum & Kyng 1991).

14.6 Conclusion

Methods developing from across the design methods and design anthropology spectrum provide structures for exploring possible futures (Halse 2013) through the interaction between people, scenarios and design artefacts (Wallace 2010). Envisioning future consequences resulting from of the products of design activity will always be in a large part uncertain. Methods such as these however are able to draw attention to particular ways of being in the world amid the emergence of new technologies. The cultural history of robotics and its deeply embedded imaginings and fantasy of human interaction, seem to call for a better understanding of people's actual engagement in the world. The application of suitable design methods can provide ways of contextualising imaginations in ways that can draw attention to how people may be effected, not simply to behavioural and functional ways of being in the world, but in ways that are grounded in particular cultural contexts and sensitive to people's sociality and humanity.

References

Alexander, Christopher. 1971. *Notes on the Synthesis of Form*. London, Harvard University Press.

Archer, Bruce. 1981. "A view of the nature of design research." In *Design: Science: Method*. Edited by Robin Jacques and James A. Powell. Guilford: Westbury House, 36-39.

Bánáthy, Béla H. 2013. *Designing social systems in a changing world*. New York: Plenum Press.

Bunge, Mario. 1980. *Epistemologia [Epistemology].* Sao Paulo: TA Queiroz Editora Ltda.

Bødker, Susanne. 1991. "Cooperative Prototyping: Users and Designers in Mutual Activity." *International Journal of Man-Machine Studies*, 34(3): 453-478.

Clarke, Alison J. 2010. *Design Anthropology: Object Culture in the 21st Century*. New York: Springer.

Clarke, Alison J. 2010a. *Design Anthropology*. New York: Actar.

Cole, Robert, Sandeep Purao, Matti Rossi, and Maung K. Sein. 2005. "Being proactive: Where action research meets design research." *Proceedings of the Twenty-Sixth International Conference on Information Systems*, Las Vegas.

Cross, Nigel and Robin Roy. 1989. *Engineering Design Methods,* Vol. 4. New York: Wiley.

Doblin, Jay. 1987. "A short, grandiose theory of design." *STA Design Journal, Analysis and Intuition*, 6-16.

Dresch, Aline, Daniel Pacheco Lacerda, and José Antônio Valle Antunes Jr. 2015. "Design science research." In *Design Science Research: A Method for Science and Technology Advancement.* Edited by Aline Dresch, Daniel Pacheco Lacerda, and José Antônio Valle Antunes Jr. Springer International Publishing, 67-102.

Dubberly, Hugh. 2004. *How do you design. A compendium of Models*. San Francisco: Dubberly Design Office.

Dubberly, Hugh and Shelley Evenson. 2011. "Design as learning---or knowledge creation---the SECI model." *Interactions*, 18(1): 75-79.

Eekels, Johannes, and Norbert F. M. Roozenburg. 1991. A methodological comparison of the structures of scientific research and engineering design: their similarities and differences. *Design Studies,* 12(4): 197–203.

Frankel, Lois and Martin Racine. 2010. “The Complex Field of Research:for Design, through Design & about Design.” Paper presented at the *International Conference of the Design Research Society*, Montréal, July 2010.

Frennert, Susanne, Håkan Eftring, and Britt Östlund. 2013. ”Older people’s involvement in the development of a social assistive robot.” In *International Conference on Social Robotics*. Springer International Publishing, 8-18.

Greenbaum, Joan and Morten. 1991. *Design at Work: Cooperative Design of Computer Systems.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Gunn, Wendy and Jared Donovan. 2012. *Design and Anthropology*. Surrey, England: Ashgate Publishing Limited.

Gunn, Wendy, Ton Otto, and Rachel Charlotte Smith. 2013. *Design Anthropology: Theory and Practice*. London: Bloomsbury.

Gunn, Wendy and Louise Buch Løgstrup. 2014. “Participant observation, anthropology methodology and design anthropology research inquiry.” *Arts and Humanities in Higher Education*, 13(4): 428-442.

Halse, Joachim. 2013. “Ethnographies of the possible.” In *Design Anthropology: Theory and Practice*. Edited by Wendy Gunn, Ton Otto, and Rachel Charlotte Smith. London: Bloomsbury, 180-96.

Jones, John Christopher. 1980. *Design Methods*. New York, John Wiley & Sons.

Kimbell, Lucy and Joe Julier. 2012. “The social design methods menu.” Perpetual beta. Accessed from http://www.lucykimbell.com/stuff/Fieldstudio_SocialDesignMethodsMenu.pdf

Koberg, Don and Jim Bagnall. 1972. *Universal Traveler*. Los Altos, CA: William Kaufmann.

Kumar, Ranjit. 2014. *Research Methodology: A Step-by-Step Guide for Beginners.* London: SAGE Publications Ltd.

Kumar, Vijay. 2004. “Innovation planning toolkit.” In *Proceedings of the Future Ground Design Research Society International Conference*, Melbourne, Australia, November 2004.

Kumar, V. 2012. *101 design methods: A structured approach for driving innovation in your organization*. John Wiley & Sons.

Lawson, Brian. 1991. *How Designers Think: The Design Process Demystified*, 2nd ed. The University Press: Cambridge.

Mankins, John C. 1995. “Technology Readiness Levels: A White Paper.” Washington, DC: NASA, Advanced Concepts Office, Office of Space Access and Technology.

Margolin, Victor. 1998. "The multiple tasks of design research." In *No Guru No Method? Discussion on Art and Design Research*. Helslnki: Universlty of Art and Design, 43-47.

Murphy, Keith M. and George E. Marcus. 2013. “Epilogue: Ethnography and Design, Ethnography in Design ... Ethnography by Design.” In *Design Anthropology: Theory and Practice.* Edited by W. Gunn, T. Otte, & R. C. Smith. London: Bloomsbury, 251-268.

Murphy, Keith M. 2016. Design and Anthropology. *Annual Review of Anthropology*, 45: 433 - 449.

Simon, Herbert A. 1969. *The Sciences of the Artificial*, 3rd ed. Reprint 1996. USA: MIT Press.

Stewart, Tom et al. 1999. ISO 13407 Human-centered design processes for interactive Systems.

Wallace, J. 2012. “Emergent artefacts of ethnography and processual engagements of design.” In *Design and Anthropology*. Edited by Wendy Gunn and Jared Donovan. Surrey, England: Ashgate Publishing Limited, 207-218.