DESIGN DIALOGUES: ONE

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'Design Dialogues: one' was the first in an occasional series of discussion meetings on design theory sponsored by the Design Research Society. The objective of the meeting was to explore the reasons for the apparent lack of progress in design research over the last decade and in particular whether the search for an atemporal, acultural, domain independent theory of design is a reasonable or realistic goal. The meeting was held on the 17th of May at the Department of Computer Science, University College London and attracted more than 40 participants from a wide variety of disciplines including the arts, architecture, computer science, engineering and business studies.In an attempt to continue the debate in the wider design research community, we have produced the following summary of the presentations and discussion period together with some concluding remarks. While we have made every effort ensure that summaries of the speakers presentations and the discussion are accurate, readers should be aware that they are based on notes taken during the meeting itself and consequently reflect a particular interpretation of the proceedings. However, for those who wish to follow up the ideas presented by the speakers in more detail, we have included a short list of references to relevant work at the end of this meeting summary.

INVITED TALKS The meeting was split into two parts. The morning session consisted of three talks by invited speakers: Professor Nigel Cross of the Open University; Professor Ernest Edmonds of Loughborough University of Technology; and Professor James Powell of the University of Salford, each of whom set out their own position on the possibility of a universal theory of design. This was followed after lunch by an open discussion which took as its starting point the issues raised by the speakers and the initial response of the participants from the morning session. Both sessions were chaired by Aart Bijl from the Department of Architecture at the University of Edinburgh.

Progress towards a domain independent theory of design: Nigel Cross Nigel Cross took as his starting point a quotation from Herbert Simon's book 'The Sciences of the Artificial': "the proper study of mankind is the science of design" and argued that the challenge for design research was the paradoxical task of creating an interdisciplinary discipline Q a 'conversation' which connects across disciplines to reach a common understanding and create new knowledge and perceptions of design. Questioning the assumption that the role of design research is to change design from an art to a science, he distinguished between 'scientific design' Q utilising scientific knowledge and a mix of intuitive and nonintuitive design methods Q and a 'science of design' Q attempts to improve our understanding of design through scientific methods of investigation. A primary goal of the Design Research Society since its founding in the 1960s has been a domain independent theory of design within the context of a science of design. The concern of design research is the development,articulation and communication of design knowledge Q those forms of knowledge particular to the awareness and ability of the designer. Professor Cross identified three sources of this knowledge: knowledge that resides in people Q how people design and learn to design (design epistemology); knowledge that resides in the processes of design Q in the form of design representations, strategies and tactics (design praxiology); and knowledge that resides in design products Q informal knowledge in artifacts and formal knowledge of artifacts (design phenomenology). Over the last decade, there has been a growing acceptance of design on its own terms, a recognition that we do not have to turn design into an imitation of science or accept that it is a mysterious and ineffable art. In support of this view he cited the growth in the number of design journals from a number of different disciplines which collectively have the possibility of extending the approaches to design research and developing the culture of design research.

From empirical studies to theories of design: Ernest Edmonds Ernest Edmonds described a research programme linking empirical research, design theory and the development of computer aided design

systems. He argued that conventional sequential models of the design activity are of limited value when developing CAD systems. Empirical studies of designers using CAD systems invalidate the idea of careful, systematic transitions between design activities and highlight the importance of contextual factors, knowledge access, the development of knowledge during the design process and the cognitive style of the designer. Using the example of the design of the monocoque frame which has revolutionised racing bicycle design, Professor Edmonds showed how a restrictive computer based design support system could limit the development of novel solutions and stressed the importance of emergence in developing new design ideas. Instead he advocated constraint based models of design which in turn impose requirements on CAD systems to support design, e.g. the ability to suspend judgment on any matter or to reformulate the problem space. This progression from CAD systems to empirical studies to design theory is a cyclic process: the formulation of a research agenda leading to the development of CAD systems which allow the investigation of the design process, the outcome of which suggests reformulation of the research agenda.Such studies highlight the difference between 'clean', 'neat' theories of design and design practice and lead to a range of theories categorised by the purpose of the theory, which can be applied across domains. He argued that there was considerable scope for cross domain theories derived from empirical studies of the design process. Such theories are not simply descriptive but are capable of changing the design process.

Learning, cognitive and informing styles for design: James Powell James Powell argued that design can be understood in a number of different ways: as a game; as a reflective practice; as a search for design solutions, but always in the context of design as action in the world and the pressures on designers. Being designerly is not the same as being scientific Q rather it is self-referential, selective and passionate. Different designers work in different ways adopting different world views and frames of reference. Design can be seen as a process of conjectures and confirmations in which designers act to protect themselves and their frames of reference. Given this view of design, Professor Powell considered the problems of building information systems for designers which are capable of reaching to the 'core' of the designer and can be adapted to their different 'information and learning styles'. He advocated an approach based on four learning styles: dynamic, focused, rigorous and contemplative and summarised an empirical study of the design styles and information rejection strategies of architects, design scientists and humanities specialists which illustrated the contrasting styles of practitioners and researchers. This lead to a discussion of methodology and the proper aims of design research. Given the disparity in viewpoints of practitioners and researchers, Professor Powell questioned the idea of 'theories' of design, preferring instead the more inclusive term 'design studies'. Such studies should focus on the content and context of design with the aim of developing useful paradigms to aid design. Such an approach leads to different kinds of theories of design and denies the possibility of a universal scientific theory of design, though some form of universal theory may be possible which relates design studies and practice in a theory for change.

DISCUSSION

The afternoon session, moderated by Aart Bijl, produced a lively and interesting debate with a high degree of involvement by the participants. While John Chris Jones argued strongly for abandoning theories and a return to improving the practice of design, most agreed that some form of 'theory' of design would be a good thing and the discussion centred on the kind of theory we should be pursuing. There were a wide variety of views as to what 'counts as' a theory and who gets to decide what is or is not a 'theory of design', ranging from a set of empirical generalisations in an appropriate formalism to more informal characterisations of theories validated by researchers or through their application in practice and education. It rapidly became apparent that the participants split into two broad groups over the related question of what a theory is for, with one group adopting a traditional academic position based on the intrinsic value of knowledge and the other taking a more instrumental view, citing the need to assist designers and improve design education by locating and supporting the design process. On the question of whether theories, of whatever kind, can be domain independent, there was a similar diversity of views. However, perhaps surprisingly, these differences cut across the 'what is a theory' and 'who is it for' divide, with some participants believing that some form of universal theory is possible ranged against those who argued for the incommensurability of different views of design or that the elimination of context necessary for a universal theory would result in an activity unrecognisable as design.

CONCLUSION

Predictably, the question which formed the theme of the meeting: "is a domain independent theory of design possible", was not answered. However it served as a focus for discussion of more general issues about the aims and context of design research. The discussion revealed a diverse understanding of what constitutes research towards a theory of design within the design research community. The main issue that emerged was that of the purpose of design research, with a clear division between those who want to study design per se and those who want to improve design and design education. These differences in goals would appear to have profound implications. Even if we adopt the view that theoretical understanding precedes application, the differences between the two views lie deeper and extend to what 'counts as' a theory or even a successful piece of research. For example, while some participants would have been happy with a theory which offered no basis for practical application and perhaps was not even testable in the conventional 'scientific' sense, those adopting a more pragmatic view would not. While the clear division over objectives appears to offer little prospect for rapid progress towards a universal theory of design within the already fragmented design community, there is clearly scope for further cross disciplinary dialogue and research activity concerning the purpose and role of increasing our understanding of the ontology of design.

REFERENCES

Cross, N., "Science and Design Methodology: a review", Research in Engineering Design, Vol 5, no 2, 1993, pp 63Q69

Candy L. and Edmonds E., "Artefacts and the designer's process: implications for computer support to design", Journal of Design Science and Technology, Vol 13, no 1, 1994, pp 11Q31

Powell J. A. and Newland P., "Informing Multimedia: a sensitive interface to data for construction design professionals", Design Studies, Vol 15, no 3,July 1994, pp 285Q316

DESIGN STUDIES AWARD

The meeting concluded with the presentation of the Design Studies award for 1994 to Professor Bill Hillier and Dr. Alan Penn of the Bartlett School of Architecture for their paper entitled "Virtuous circles, building sciences and the science of buildings: using computers to integrate product and process in the built environment" (Design Studies Vol. 15, no. 3, July 1994, pp 332Q365). Following the presentation Professor Hillier gave a talk about his work which included a demonstration of the computer based modelling which is described in the paper.

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