

The Integrated Conglomerate Approach.

A Suggestion for a generic model of design research

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Abstract

In this essay the 'Integrated Conglomerate Method' is brought forward as a generic model for design research.

Integrated: integrated in practical activities, spiral from tacit to explicit to tacit. Learning through doing. Exploration through practice. Practical work fuelled by theory. Theory derived from practical investigations.

Conglomerate: means to apply the adequate method to the theme or the part problem at hand.

Triangulation of conglomerate findings from scientific and practical investigations is the glue that relates the partial explorations to each other and gives the research generic value.

Introduction

Design is a phenomenon that includes design as a quality of objects, design as a profession, design as method, design as cultural expression, design as marketing strategy and so on. Design research is as faceted as "design" its self, and varies according to the diverse aspects of design that are investigated. This is not an unknown situation in other sciences, but since design is a specially broad angled field with a mixture of both practical activities and theoretical knowledge overlapping several professions and sciences, and since the research tradition in this field is very young, the situation is especially confusing.

This indicates that the discussion about research in design has to be held on a specific level rather than a generic. Through the study of applied research cases, the methods and theories of design research will emerge.

Most practical oriented design research projects cover several areas for which we can borrow methods from other sciences. But most likely the appliance of diverse methods and sources will lead to fragmentation, forcing focus away from design-specific topics into specialist fields. A fragmented approach fails to address the general nature of design research as a manifold research field. The unavoidable complexity in design research comes from the fact that design is a field (theme) defined by the relations between its parts more than by its singular components.

Engineering in design has to be seen in relation to formal and cultural aspects and vice versa.

Formal issues have to be seen against material technology, marked, culture etc. If all these aspect

are seen isolated the singular parts slip out of the hands of the designer or design researcher and get food for the specialists, like art historians, engineers and market research.

Clustered problems, typical in design research, are defined not only through the selection of the entities in the cluster but also through the inner structural connections between those entities. This implies that clustered problems need to be investigated on a structural level (relations).

The tool to meet these difficulties is not necessarily to tighten the standards for research methods as such, through the laborious appliance of conservative research models. Instead we need to grasp the whole. In that sense design research is similar to other system focused research areas, such as ecology and ethnography (Fettermann 1989).

Trading width against depth

Though many design researchers are holding an academic position a great deal come from a professional background. Also the academic tradition in design education at least in Europe is still under influence of the arts and craft education, rather than an university based scientific tradition. This implies that many design research projects are small-scale practitioner research.

Robson describes the difficulties and advantages of the practitioner researcher. (Robson 1993) They imply that in cases where practical work is a substantial part of an inquiry the advantages of the practitioner researcher (Insider opportunities, Practitioner opportunities, Practitioner-researcher synergy) will balance the disadvantages (Time, Lack of expertise, Lack of confidence, 'Insider' problems). This implies that the practitioner researcher needs to take special care to the distribution of time. It is also important with a continuous evaluation of relevance in the research to take advantage of the insider perspective and synergies between practical work, theory and educational work.

Instead of tightening the rigidity of research methods and increasing the depth of investigations I suggest that one consciously and continuously negotiates the level of depth and level of width in the investigation. Framing the area of research is unavoidable. The question is at which stage of the process to frame it and how rigorously to stick to the frame. Dynamical framing avoids excluding related issues that turn out to be of significance during the investigation.[1]

Relevance, consistency and argumentation

The strategy of widening the frame on the cost of depth makes the universal problems of relevance and consistency acute. Relevance and consistency are impossible to compute.[2] Therefore all science in a certain degree depends on human judgment of relevance and consistency. This judgment is based on argumentation. Soft sciences dealing with complex and partly hidden issues like culture or human thoughts are more dependent on high-level judgment, but even natural sciences are depending on judgment in many cases.

No raw data, whether quantitative or qualitative, stands entirely for itself. All results from experiments never so rigorous or seemingly self-explaining need a foundation of theoretical explanations and an 'umbrella' of applied explanations. Raw data is meaningless without somebody arguing what the data implies.[3] Argumentation is underpinned by hierarchical trees of pro and counter arguments selected according to relevance through 'qualified judgement'. Depth of this argumentation is levelled when achieving 'sufficient evidence' or 'good evidence' as Giere puts it. (Giere 1991)

The fact that we only can argue for relevance (and consistency) through a process of 'mysterious' judgment leaves a personal responsibility to the researcher. As design researcher we cannot escape our responsibility to identify the most relevant areas and modes of design research by playing a game of scienticism. Our judgment, if to be taken serious and considered relevant by the design community must deal with the important issues of design though they might be complex and cross several disciplines.

Inclusive strategies

The conception that a topic of research needs to meet certain requirements to be researchable (which excludes even some material phenomenon, just because of their complexity from the realm of science) should be outdated after ecology, ethnography, and action research. Grounded theory demonstrates systematic inquiry into complex areas where we do not have any pre-made theories, hypothesis or even a conception of problems. This demonstrates that there is no such thing as an un-researchable phenomenon. These soft sciences might be criticised for methodological reasons, but the only alternative offered by orthodox science is avoidance and passivity. We might not be able to research all aspects of a theme, and the results might be more or less reliable, but in principle any phenomenon is researchable or eventually will be. If it gets crucial we will research it no matter methodological difficulties.

This opens up for the inclusion of practical activities and visual material in design research

Visual material in research

Visual material plays an increasingly important role in all sciences after the introduction of computer simulation and the graphic computer. The relation between such material and text is worth studying for any research in the visual professions. Complex raw data needs to be presented in ways that render the patterns in the data. From many examples one of the most relevant (because of its integration of aesthetics and readability) is recent research in fluid dynamics.[4] In fluid simulations the raw data need to be rendered in a superficial way that will clarify blurred or invisible aspects of the phenomena. The relevance of the algorithms that produce the simulations needs to be underpinned by theory and argumentation, and comparison with the effects of real life phenomena. The calculated raw data are incomprehensible without visualisation where certain aspects are emphasised and others blurred. When these data are rendered aesthetical concerns are central to produce the visualisation. The raw data are translated

into visual material, which only makes sense if we visually interpret certain patterns from which we apply or derive a theory. One could talk of visual evidence or even aesthetical evidence.

Design research could benefit from a similar intimate relation between its visual data and text. This implies a much deeper concern into visual material and analyses, than what is often seen.[5]

Investigations based on practical activities

Practical investigations produce first of all tacit knowledge and problem solving experience but also theories in the sense of small-scale generalisations. While tacit knowledge and design experience immediately is implemented, theory needs to be related and connected to a bigger context. Otherwise its potential to contribute on a generic scale is wasted.[6]

Research into practical activities means to lift tacit and undocumented practical based knowledge into explicit knowledge through an analytical approach. One obstacle to give practical activities its deserved place in research lies in the lack of recognition to knowledge generation rooted in practical work. Often we can find a practical (often visual) based activity that precedes the discovery and following textual formulation of theory.[7] This should be taken as a great advantage for the design researcher as long as we can cope with the tentative and inventive, 'not-always-knowing-what-we-are-doing' type of practical inquiries. Post rationalising should not be embraced as long as we are open about the process. In this way we produce our own research material. Grounded theory based analyses is a well-suited tool to integrate such material to a textual argumentation since it is the techniques that allows us to produce theory from qualitative phenomenon.

But equal important is the feedback of theory into practical work. Theory can spin off new and highly creative reconfiguration of design, as demonstrated especially in architectural design.[8] This type of spiral between tacit and explicit, practical work, and theory might not only be the most productive state of investigation and research, but also one that suites the designer as researcher and theorist especially well.[9]

The Integration of Practical Work

Though the relation between practical work and scientific investigations has been debated in design research as an especially difficult question this is by no means an unknown problem in other sciences. The problem needs to be addressed from the perspective of methodology to give us concrete solutions to how practice and theory can relate.

Practical work in practitioner research is first of all integrated into the research project because it produces data for the project. According to a conservative research dogma the practitioner researcher would be forced to ambulate between the role as deeply involved practitioner and 'disinterested' researcher applying an outside perspective. But the 'insider' problems constantly threaten to bias such an idealistic process. The appliance of less orthodox research takes more advantage of the insider opportunities reducing the importance of the insider problems. Grounded

techniques would reinforce the potential in being both practitioner and researcher. The data from practical work is sampled to theory and feeds back into practical work. Practical work influences and alters theory as theory influences practical work during the research project. In addition the insider problems can be reduced through comparative studies of similar work by other practitioners, literary studies and studies of other sources for theory.

Robert Yin's conception of the case study as a method that consists of a variety of different modes of investigation is a good starting point for the development of a research modus, which is able to absorb different types of research. The glue, which binds these methods together, is triangulation.[10] Triangulation represents an additional meta-level of analyses where the findings from the different methods and sources are compared. Triangulation as a method is not exactly described by any of the writers found in this inquiry. It is simply referred to as comparison of data from different methods and sources. A systematic approach to triangulation remains to be developed. Suggestive it could be based on open coding techniques in a similar manner as conducted in grounded theory and through 'Pro et Contra' analyses.

The case study method as described by Yin does not cover the areas of research based on practical investigations nor does it treat the problems of creating new knowledge or promoting change (in contrast to investigating preset problems). But nothing implies that these additional techniques cannot be integrated in this concept. So when we have an over branching and inclusive system that mainly operates on a structural (diagrammatic) level, the step forward to integrate the lacking elements should be possible.

Difficulties in methods and culture

The integration of practical design work and theoretical text meets some difficulties when it comes to working culture and methods. These difficulties have been addressed in several occasions by soft sciences because of the need to generate data from very complex phenomena and in situations where the access to data requires direct involvement.

Typical for many of these approaches is that they start off with no or few preconceptions, as open-ended investigations. Several sociologists and ethnographers have described unfocused observation methods (Glaser and Strauss 1967; Jorgensen 1989). These approaches demand little adaptation to be applied directly on practical design work in a research study.

On the other hand some artists and designers are conducting rigorous 'scientific' processes in parts of their work, which could feed into the mutual understanding of the relation between scientific enquiry and design. (E.g. Greg Lynn (Lynn 1999) Peter Eisenmann (Eisenman 1999)) These 'detached' design methods indicate a possible altering of the research integrated design process, which would make it more accessible to analyses and research.

Integration is necessary

Though not all design research needs to include a practical inquiry, design research at large, without a substantial amount of such research projects is unthinkable. This is because a design

research only conducting withdrawn, observer-based research will not achieve recognition amongst the practitioners and in design culture in general. It fails to address the most pressing questions in design.

Seamless integration between practical activities (research by doing) and writing is possible in design research. The design researcher with a practical background and a professional or educational activity has access to additional sources of experience and knowledge, which is potentially beneficial to research if integration is achieved.

(Word count 2303)

NOTES

[1] Theoretical sampling as suggested by Glaser and Strauss is a process for data collection where the theory emerges from the collected data and simultaneously controls the process of data collection. (Glaser and Strauss 1967) pp45

[2] See Forland for pro et contra analyses. (Forland 1996) See Jo Sivertsen on Consistency algorithms (page 39) and a review of Daniel C. Dennet's famous example of the R2D1 robot. Page 55 (Sivertsen 1996)

[3] Giere's model for scientific reasoning shows that even natural sciences are depending on reasoning as evidence. (Giere 1991)

[4] For an illustration of fluid simulations see Scientific American special issue on extreme engineering 2000.

[5] An example is D. Schons classical case of Petra and Quist. pp 86-87 (Schön 1982) The sketches in the example are obviously redrawn. Redrawing of sketches implies diagrammatic analyses. Such analysis is not a negative thing, in contrary it should be used and applied much oftener, but in this case it is done with no motivation or justification, and the original material is not presented.

[6] Robson (referring to Winter) argues for a methodological difference between the practical work and the research it self. (Robson 1993)

[7] This is a general phenomenon relevant for all sciences. See Mihaly Csikszentmihalyi's inquiry of one hundred remarkable creative people in a wide range of scientific cultural and professional fields, especially the opening case of the famous astronomer Vera Rubin, pp2 (Csikszentmihalyi 1996)

[8] E.g. Peter Eisenmann Diagram Diaries, which also treats problems of methods and the relation between visual material and theory. (Eisenman 1999)

[9] The relation between practical investigations and theory in design has earlier been treated in my essay "Research on digital design strategies" (Sevaldson 1999) and by others like Ken Friedman. (Friedman 1999)

[10] The advantage of using several different methods and sources is that this opens the possibility to triangulate them. (Robson 1993) (Yin 1994)

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