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Exemplary Design Research

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Design Research Between (Design) Theory and (Design) Science

To combine the terms design and research produces an ambiguity that has been discussed already by many authors. As some have phrased it we may for example ask: Is it research about design?, is it research in design? or is it research through design? [Frayling, 1993] If we compare with other terms such as “dental research” or “clinical research” we can see that the qualifiers can either indicate a particular topical area (like research into the treatment of teeth) or a particular research setting (research within the boundaries of the (medical) clinic). A perhaps even more relevant comparison could be to “market research”, understood as research into market opportunities and consumer preferences, thus indicating research directed towards exploring new possibilities within a particular domain and with a particular professional orientation.

For us, design research is similarly a venue for knowledge production that is directed by the professional interests of design communities. Such research may be conducted by designers as part of their work, or it may be led by academic institutions aiming at expanding our knowledge of ‘what’ can be designed and ‘how’ designing can be done. But what are the marks of excellence of such research and how can it claim its relevance and ensure credibility of its results? How does the knowledge produced relate to design itself? In search for answers to these questions, we will briefly survey three well-known yet seemingly orthogonal sources of knowledge production related to design.

The first source, often called *design theory*, has its origin in art history and literature theory, and takes as its starting point design to be the aesthetic production of form associated with such well established genres as graphics design, industrial design, fashion design, textile design or ceramics. Design theory seek to produce knowledge about the results of what designers do, and organize this knowledge into theories about what constitutes a design and how designs are operating in a societal context [e.g. Greenhalgh, 1990]. Design theory may even provide us with insights into design as a cultural phenomenon, and contribute to our understanding of how people make sense of designed objects [e.g. Attfield, 2000]. Within the framework of design theory the knowledge interest is primarily to shed light on the field of design as aesthetic expressions of socio-cultural



conditions, and like the relation between art and art theory, there is typically no ambition of producing knowledge that is in any way operative to the designer.

Our second source developed during the 1970's and 1980's with the interest in what computer technology could bring to the way designers work. This tradition, often referred to as *design studies*, focuses on the act of designing and has mainly through protocol analysis sought to establish knowledge about reasoning, representation and choice as the designer takes him or herself through a design assignment, like documented for example in [Goldschmidt and Porter 2000]. The knowledge interest in design studies is primarily to develop models of design thinking that help to identify how such thinking can be facilitated, or even rationalized. More lately anthropological studies of designing in real life settings has been taken up in this tradition [e.g. Cuff, 1992], but with a very few exceptions like [Porter, 1988]. design studies do not put particular emphasize on what is designed. The objectives in this tradition include providing a better understanding of the environment in which designing takes place, as for example in educational settings [Schön, 1987], but the tradition is not prescriptive in the sense that it aims at improving the way designers work. Though the studies may contribute to the designers understanding of their own work, and thus to a more reflective attitude, it produces at best a foundational contribution to the epistemological question of how designers know.

The third source of knowledge about design and designing that we will point to, is the tradition often associated to the notion of a *science of the artificial*. In this tradition, 'design' is used as a broad term covering all those professionals that in Herbert Simon's terms are engaged in changing "existing states into preferred ones". Two characteristics have to be taken into account according to this tradition [Simon, 1969]. First designing must be understood as directed towards solving societal problems, where solutions are conditioned by the constraints provided by other problems and solutions and the resources made available. This means that solving problems has to produce 'good enough' rather than 'true' solutions. Second, the outcome of designing is 'artificial' in the sense that design devises artefacts that interface social and natural systems according to intentions and goals, i.e., essentially man-made.

Unlike design studies, the idea of a design science does not work from within the minds and bodies of designers, but concerns itself with understanding methods and procedures that can ensure that what designers do lead to intended results. A design science must provide the basis for analysis of design-relevant problems and decomposition and abstraction of goals into generic sub-goals. In parallel rational methods must be devised that makes it possible to establish choice opportunities in a generalized solution space. The knowledge interest is here how to govern and control rational problem-solving, and provide rational methods that designers and others can apply in order to arrive at "good enough" solutions. Unlike the other two traditions mentioned, knowledge production is here directed towards prescribing procedures and strategies for designers to follow. Yet these are rather measures of guidance and control than actually depicting the way through which designing is accomplished.

Whereas these three different threads of knowledge production surely contribute to our understanding of design, it is striking how they are mutually incompatible and all employ what could be called an observer



perspective. Design theory can tell us about how the works of designers are part of cultural systems of aesthetic expression and experience. Research claims can be contested through alternative readings of the works and their participation in larger societal and historical contexts. But turning such insight into operative knowledge in designing would violate the essential premise of the autonomy of the design work. Design studies can give us essential knowledge about the reasoning and acting of designers that form the core of design as professional practice. This may lead us to a better understanding of how designing can be taught and in what ways new tools may be adapted by designers. We can however not derive from design studies any valid claims about what designers need to know. Even less can claims be made concerning what designers can do, as this would presuppose an inclusion of conceptualizations either of a generic nature of design or of the goals and experiential qualities inherent in works of design against which these claims could be evaluated. Finally a design science of the kind nurtured in the tradition of Simon's "science of the artificial" can provide us with "checks and balances" as to whether design work is instrumental to the accomplishment of societal ends and is accountable to structures of rational choice. There is however no way that a design science of this kind can tell us if this work can actually be sensitively done by designers, or how this instrumentality can be embodied in aesthetically comprehensible form.

These 'short comings' are not in any way coincidental, but rather inherent to the research perspectives applied within the three traditions. For a design research aiming at exploring new terrain for design and designers these traditions fail to provide a participant perspective that allows for an integrated approach to experience, ethos and instrumentality. Such an approach will need to be informed by, and prove its compatibility with, scholarly research of the kind that the three traditions provide, but it must acquire its relevance and credibility through other strategies. In what follows, we will present one way this could be done.

Exemplary Design Research Driven by Program, Experiment and Intervention

With the notion of "exemplary design research driven by programs, experiments and interventions", we refer to research based on the explicit formulation of design programs that act as a frame and foundation for carrying out series of design experiments and interventions. It is 'exemplary' in the sense that it enables critical dissemination through examples of *what* could be done and *how*, i.e. examples that both express the possibilities of the design program as well as more general suggestions about a (change to) design practice.

To adopt a participant perspective is not unique to design research. In dental research, research questions will also be framed by the way dental problems can be conceived by those professionals that deal with dental care. This framing is not universal and can not be understood from inquiries into for example dental diseases alone. In one context where dental care is organized around clinics for dental surgery, dental research may mean explorations and evidence-based research into new surgical methods or new strategies of post-surgical treatment. In another context where dental care is primarily organized around prevention, dental research is likely to focus differently on, for example, care plans for healthy teeth and strategies for monitoring and affecting such issues as teeth brushing and other preventive measures. It is the research program that ensures



that what is researched can also be transformed into viable new procedures applicable within a particular context of professional practice.

The dependency on a framing program is even more profound when it comes to design research. If we think of how to research the feasibility of new approaches to service design or how to explore a new language of form that may stem from the introduction of new materials or the emergence of new patterns of everyday living, we must condition this research by accounting for the particular socio-cultural setting in which it is conducted. In this respect we may compare design research with the clinical research of the medical professions, where the search for new knowledge is pursued within the framework of the medical clinic. But unlike medical research, design research can not claim evidence for its results with reference to hard facts such as rates of recovery, cure or well being. Design is inherently about proposing in Jones words “a change in man-made things” [Jones J. C, 1980]. This produces a double challenge for design research, as it must both be exemplary in the sense that it demonstrates that what is proposed by the program actually can be done, and additionally evidence that pursuing such a line of inquiry will, also for others, provide opportunities of unprecedented change and novelty.

In this sense, design research has to go beyond established disciplinary modes of inquiry. If a design researcher wants to explore what it means to designing if information technology is regarded as a design material rather than as a tool, or if the design researcher wants to challenge conventional notions of space and place in order to envision new venues for design of mobile devices, then answers to the questions posed have to be qualified by stating how these answers relate to how we can know and also what we can know through such inquiries. The design researcher must in other words establish a knowledge regime somewhat similar to a discipline in order to frame and contextualize his inquiry. The design research program, which we will also give examples of later in this paper, operates as such a provisional knowledge regime. That the program is provisional means that it is not unquestionably presupposed but rather functions as a sort of hypothetical worldview that makes the particular inquiry relevant. As the design research unfolds, it will either substantiate or challenge this view and the dialectic between program and probing is in our view central to this kind of design research.

The mutual interdependency of program and inquiry is, however, not unique to design research. It is also found in the growing bulk of so-called transdisciplinary, or as some call it *mode II* [Nowotny, H. 2004], type of research that takes its research questions not from within the disciplinary discourse but from societal challenges arising at the intersection between different knowledge domains. Examples of such transdisciplinary research range from research involved in large technological programs, such as the European Airbus project, to more policy oriented research, as for example has been conducted in crime prevention programs in big cities [Siggard Jensen, H. 2004]. Similarly to what we said above about design research, such transdisciplinary research must by and large operate within and to some extent even co-produce the ontology and epistemology that makes it relevant and accountable.

In examples such as the Airbus project, the validity of the research made, can by and large be produced post hoc as the program eventually turns out to be successful. This will rarely be the case for design research as the



scope of this research typically will be to provide and propose strategies that also must be capable of producing yet new knowledge. Action research has dealt with similar problems as it suggests an integrated approach where researchers probe for new possibilities through engaging in interventionist action with participants in the topic area. Action research has particularly been applied in organizational research, where researchers for example has taken on a kind of consultancy role in change processes in parallel with monitoring and evaluating effects of the instated change [Foote Whyte, W. (ed.) 1991].

The main argument for this approach, also relevant for design research, is that research into for example new organizational models or organizational change processes will have severe delimitations if the researcher is not able to propose and engage with modes of change that appear relevant and promising. An obvious problem with this approach, that has also been the subject of heated debate, is that the researcher becomes dependant on the success of the intervention and in this way loses the ability to challenge assumptions and question results. Some authors have however pointed to that re-framing the action as interventionist experiments open for scrutiny both on the side of practitioners and researchers may be a way out of this potential pitfall [Argyris, C & Schön, D. A. 1991].

What we see as needed for design research is the commitment to experiments that somehow make the research program open for tests of accountability and relevance. This test, however, is not a simple question of confirmation or rejection as discusses also in [Schön, D. A. 1983]. Rather, the experiments are exploratory probes into what the program may entail and how it can be expanded and sharpened to account for how the experiments unfold. Experiments need not be full-fledged design work as it would have been done in a professional setting [Brandt, E. 2004], but it has in our view to be exemplary and interventionist in the sense that it engage with a reality of designing outside the confines of the research setting.

(Design) Program and (Research) Practice

Over the last decades new research institutions have emerged that give priority to program-driven research. In the field of interaction design, this development was pioneered by the MIT Media lab with their model of thematic project consortia such as the “Things-that-think” consortium launched in 1995. Developments in information technology made it increasingly clear that new application areas could not be derived from new technological possibilities alone, but had to be generated from a programmatic stance towards technologies in use. Overarching programmatic clusters under such headings as artificial intelligence, virtual reality, intelligent agents and later ubiquitous computing have competed to define a direction for technological progress, and through the 90’s we saw new research and design institutes come up that defined their research agenda from a design, rather than from a technological point of view.

One of these, the Interactive Institute formed in Sweden in 1998, brought together technologists, artists and designers to create what was called a studio-based research environment. In the research studios, which were established for typically a five-year period, a studio program nurtured crossovers between conceptual design, artistic production and scholarly research, all directed towards an exploration of the programme. In what



follows, we will use some examples from this environment to illustrate what an exemplary design research driven by program, experiment and intervention may look like.

Augmenting Places and Moving Stories

Spatial metaphors have since the mid-90's gained wide-spread popularity among IT designers. Computer applications were seen as providing a space for experience and interaction and researchers had become interested in how such a space could be seen as structured in chat rooms, agoras or sites where people could meet and engage with one another. Furthermore the rapidly increasing development in computer-based visualization gave rise to an expectation that a naturalistic virtual environment could be created within the computer that made it possible to handle still more parts of the real world through the computer interface. There were, however, also researchers who argued that the real challenge to IT design was to envision a future where computation becomes ubiquitous and has to blend in with the physical environment of the everyday. We wanted to enter this discussion in critical dialogue with these positions. We also wanted to question the dominant view that innovative interaction design had to come out of technologically oriented research labs. To put ourselves on the stage we formulated the design program: *Augmenting places*. [Binder & Hellström 2005] Already with the title of the program we sought to give our own twist to the discussion. Inspired by ideas of seeing computer technology as something that enhanced and facilitated the physical environment, we also wanted to stretch this idea by thinking of augmentation as an active and dynamic process involving people in the environment. We also liked the idea that we should think of particular environments rather the more abstract "augmented reality" proposed by others, but we wanted to adhere even more to the social processes through which such environments become places. What we envisioned initially with this program was a way of thinking about computation and interaction design that put people in action in control of augmentation.

Our critic towards a technology driven inquiry came out of an older inclination towards the Scandinavian tradition of participatory design. We faced scepticism when we wanted to continue this tradition in a context of dramatic technological change, but we wanted to rival this scepticism by proposing that innovative patterns were already emerging in the context of use (We here took the upcoming success of text messaging as a welcome example).

Augmenting places in process plants



For an exemplary design research choosing site and collaborators for design experiments provide an opportunity to challenge the research program. Studying the role of augmentation in process plants is interesting because these environment are highly constructed with a long history of technologically mediated interaction. Project by Tomas Sokoler, Thomas Binder, Jörn Messeter, Petter Alexanderson, Nina Wetcke, Martin Johansson and Mikkel Ask Rasmussen



The work with the program developed in two directions over a period of three years. In one direction we looked for practical settings and willing collaborators for an exploration of what augmenting places could mean in practice. We were able to set up a joint project with a number of process plants where process operators and technicians were willing to work with us on an idea of a distributed control room [Nilsson et. al. 2000]. We found process plants interesting because they are highly constructed environments with a long history of technologically mediated interaction. Together with the operators we transformed technological visions of others, particularly Weiser's idea of calm technologies [Weiser 1993] into configuration devices that made operators able to configure computer-based monitoring and control of plant processes "on the fly". We deliberately played with the notions of "tools" and "places" in order to question the "what" and "where" of augmentation and we came out with concepts of dynamic augmentation, temporary views and a growing awareness of the co-construction of place and action, that we could embody also in conceptual design that attracted attention both in industry and among our scholarly colleagues. Ending the process plant project we moved to domestic settings to see if dynamic configuration could also be made sense of in households wanting to monitor their consumption of energy and water [Brandt & Grunnet 2000], and later again we established a collaboration with intensive care nurses, who despite the obvious differences between process plant monitoring and patient care also work in a highly technologically mediated and dynamic environment [Björgvinsson et al 2005].

In another direction these projects gave us an opportunity to develop our thinking about participatory design. In the process plant project we focused on user-studies of tasks and everyday problems, and entered participatory design workshops with a well proven repertoire of generic tools and devices. As we learned more about how integral the configuring and sensing of mediations are to the way operators are present in their environment we increasingly came to question the problem-solving focus that we brought with us from user-centered design [Binder 2002]. User studies became increasingly modes of participatory inquiry and collaborative prototyping sessions became workshops of prototypical learning around an evolving new everyday practice.

Moving Stories



The Moving Stories project studied how people position themselves in social space through configuration and interactions with the things around them, by conducting participatory ethnographies of people moving from one apartment to another. The project was documented in a video installation. Project by: Anna Brag, Maria Helleström and Isa Hardemo



Emblematically we began to shift our attention from the augmenting of places of use, to the staging, evoking and enacting of spaces of design. We began to study how people position themselves in social space through configuration and interactions with the things around them, by conducting participatory ethnographies of people moving from one apartment to another. And we developed a new program around the notion of “the design lab”, where designs of desire are sought for in the flickering between estrangement and familiarization of the everyday. Moving stories propelled by the probing participations of designers in unfamiliar everyday practices provided here both the thrust and the drift of program and intervention.

From Display Surfaces to Layers of Interaction

The *IT+Textiles* project was a three-year project based on collaboration between both academia and industry with focus on emerging applications in the intersections between information technology and textiles [Redström et al 2005]. In terms of research structure, IT+Textiles was based on two layers of ‘experiments’. As starting points, we used shorter, often high-risk projects with uncertain outcomes, typically involving just a few people. These shorter studies would focus on things such as a certain material or technology, a given use context, object category or a specific design method. Results from these smaller studies were then used to form larger projects involving more people and resources. Though we kept our experimental approach, these larger projects typically also aimed more towards potential products and applications.

To complement the example presented above, we will here focus on the practical work with one of the propositions in the design program; the idea that we can approach this combination of materials as a matter of using the dynamics of the textile surface to express the temporal structures generated by computational processes. Partly a reaction against a typically technological perspective on new ‘smart materials’, this was intended to place issues related to the expressiveness and aesthetic potential of textiles and information technology at the centre.

In the first design experiments aimed at exploring this relation, more abstract issues such as the expressions of different kinds of movements with respect to how they could be made to express various temporal structures were explored [cf. Hallnäs et al 2002]. In the work that followed, however, this experimental design approach was complemented by more user-centred design approaches. One starting point for such work was a study of family members being away from each other, e.g., children sharing their time between divorced parents, people staying at hospitals, or generally spending long periods away from home. These interests and ideas came together in the *Interactive Pillows* [Ernevi et al 2005]. The ideas that fed into this project are quite clearly visible in both the concept and the design of the pillows. The idea of the textile surface as a ‘display’, in this case of certain communication processes builds on the experimental work preceding it, as does the idea of ‘using’ information technology to reinterpret the use of a traditional textile object. The notion of “pillow talk” and that of hugging a pillow as something we do when longing for someone or feeling lonely, on the other hand, come from the field studies.



Interactive Pillows

The Interactive Pillows come in pairs and are wirelessly connected to each other using, in the case of our prototypes, a combination of wireless local area networks and Internet. Thus, they are meant to be connected at all times independent of location. When one of them is hugged, the other one responds by starting to glow. The pillows look like ordinary pillows, but where electroluminescent wire has been woven into the fabric in order to make it possible for them to change appearance. Project by: Christina von Dorrien, Daniel Eriksson, Anders Ernevi, Patricija Jaksetic, Margot Jacobs, Ramia Mazé, Johan Redström, Maria Redström, Erik Wistrand and Linda Worbin.

Experiences with prototypes of the pillows, from both using them ourselves as well as trying them out on exhibitions and field studies, also meant that new issues of interaction with textiles, and of communicating through textile objects came into view. Investigating the role also of other everyday traditional textile things, one set of design experiments came to centre on the (dys-)functionality of tablecloths (cf. also Worbin 2005). In a study called *Dinner for Two* we used a tablecloth treated with photochromic ink sensitive to UV light to explore textiles that can get unique patterns every time it was used. Related to how the pillows change their appearance as a result of communication, this tablecloth in a very direct way reflects the social context of its use.



Dinner for Two

The Dinner for Two was made for a romantic restaurant setting, where couples would come and have dinner before going elsewhere to enjoy each other's company. Also in a literal sense, the dining couple will get closer to each other as time goes by, as the tablecloth very slowly is being dragged into a hole in the centre of the table. Underneath the table, there is a UV-lamp and so when the table is set for the next couple the tablecloth will have a pattern revealing just how close the last couple got before leaving. Project by: Johan Redström, Maria Redström and Linda Worbin.

When using the Interactive Pillows, issues related to there seemingly being layers of use and interaction became visible. For instance, the pillows still work as pillows; they even look like normal pillows. When the light up, they to some extent act as a kind of 'lamps' and when one uses them to communicate they become devices for communication. Thus, there are several ways of using them present simultaneously. This introduced another dimension to the temporal form/spatial surface ideas we started out with. In the *Tic Tac*



Textiles project [Eriksson et al 2005], the possibility of literary playing around with different layers of interaction was further explored, e.g., relations between interacting with the physical object itself (as in the possibility of drawing on the surface using a hot cup of coffee) and using it to communicate (as when trying to use them play this game). However, we also find ideas from the early experiments with textiles and computational technology, as in the exploration of how material properties influence what it is like to use something. Here, the game itself is the same as ever, but the materials used clearly transforms how it turns out in practice.



Tic Tac Textiles

Tic and Tac are pieces of furniture designed for a place where we have a cup of coffee and spend some time waiting, for instance at a café in a railway station. By placing your cup on the table, you also enter a cross on corresponding position of a hidden Tic-Tac-Toe gameboard on the other. Playing this game is, however, somewhat different from the typical experience of tic-tac-toe as it is quite slow (as it takes time for the heat elements to make the mark on the other table) and in practice slower and slower as the coffee gets colder (as the heat sensors need a certain amount of heat to react). As such, it perhaps reflect the feeling of time running ever slower when waiting. Project by: Daniel Eriksson, Anders Ernevi, Margot Jacobs, Ulrika Löfgren, Ramia Mazé, Johan Redström, Johan Thoresson & Linda Worbin.

On a more general level, the exploration of layers of interaction also opened up for other perspectives on the idea that we may introduce ‘new’ technology through ‘old’ things. In these experiments, it is quite clear that any such new introduction also transforms the object into something else. In some cases, a kind of parallel or alternative understanding is introduced but it also seems that there are gaps in-between. For instance, when my pillow lights up, I do not really know whether my loved one is thinking of me or if someone just happened to lean against the pillow when sitting down in the sofa. Or, as in the Tic Tac Textiles, is the appearance of this mark on my table an invitation to start playing the game or is it just someone putting down her cup? Thus, these design examples also initiated a drift towards a critical examination of one of the currently popular trends in the design of information technology – that of hiding it in everyday things and environments.

Research Cycles and Drift in Programmatic Design Research

Seen from the outside, the design program is inherently normative; it is a suggestion, a proposition about a change in design practice. Though sometimes meant as a replacement of existing programs –as when modernist manifestos were presented as new alternatives to established ways of building and living– design programs typically exists in parallel. For instance, some design programs may focus on issues of ergonomics, others on exploring abstract form; some on universal accessibility, still others on deep customisation. Thus, the design program is typically not universal, even though its proponents sometimes like to think it is (perhaps



because it is meant to look like it is ‘universal’ from the inside – cf. the notion of the design program as a kind of knowledge regime we use as a frame). The program acts as a lens through which certain things will become enlarged and thus better seen, but where others will become hidden. Its validity therefore depends on the changes in practice it suggests, e.g., the potential of the design space being opened up. In other words, design programs exist in competition with each other, as they all propose certain ideas as more interesting, important or relevant than others and as they do so by proposing a certain way of doing things.

Evaluating a design research program to a significant degree is a matter of how we understand it in relation to other such programs, e.g., to what extent it enables us to think and do given things in certain, and preferably new, ways. Though the description of any eventual effects of such a program on a societal level is bound to be guesswork, we can still discuss, critically examine, compare and evaluate design programs in relation to each other. For us to be able to do this, however, they need to be ‘finished’ to a certain extent, i.e., it is difficult to evaluate a design program before we have enough examples that express it, and as such it is essentially something we do in retrospect.

Programs and experiments can be evaluated in different ways. Consider, for instance, the following:

From the *inside*, design programs can be evaluated on basis of the extent to which they succeed in fulfilling its own intentions.

From the *outside*, design programs can be evaluated on basis of to what extent they suggest viable changes and alternatives to, developments of, etc., existing theory and practice.

The inside perspective on the design program is not entirely unlike how we would understand any other experiment meant to probe and possibly also answering a certain research question, i.e., the knowledge we gain depends on how well our experiment probes our question. In the case of the design experiment, however, this is not being able to say whether a given hypothesis is ‘true’ or not, but rather to what extent the experiments flesh out and develop the basic notions of the design program. We might say that we evaluate the design program on basis of how well the design examples express the program’s potential; to what extent they take advantage of, and present, the ‘new’ design space suggested by the program.

Thus, one way of describing what constitutes the end of a ‘research cycle’ here, is when we reach a stage where it is possible, or even necessary, to basically re-formulate the program as to account for, and generate new, experiments. In practice, we ‘see’ that we are approaching this point when, for instance, our experiments do not seem to generate as much ‘new’ knowledge as we would expect them to, and as they appear to be too similar to things we have done before. But it can also be that our experiments seem to take their starting point elsewhere, i.e., that the drift caused by the program-experiment dialectics has taken us to a point where we can formulate a new program as we now see things differently. In this case, we now see earlier experiments in a different way as we trace the roots of our ‘new’ program.

In terms of evaluation, this means that the design research program has to be formulated in a way that enables the research team to finish a ‘research cycle’, i.e. although this is not a matter of having a discrete state, like on



or off, it must allow for an idea of what it would mean to have ‘realised’ it. Otherwise it will, so to speak, be left like an unfinished painting where we can trace ideas and attempts, but not necessarily see where it eventually might take us. This need for a closure that enables critical analysis can be compared to the notion of ‘loops’ in action research, i.e., that the intervention in question has to run through a whole cycle before one can say much about what caused which changes.

This issue of evaluation when using programs as a foundation for research is generally different from typical design practice where a guiding program need not be ‘finished’ as long as it still works for the purpose it was devised, as it is not the evaluation of the program as such that is of importance but rather the productive and creative work it supports. Not being meant to be sustainable for very long periods of time, the design research program therefore has to demonstrate its viability also in terms of how well its experiments come to express the proposed design space within given resource constraints, perhaps adding some aspect of real-world applicability to the largely “hypothetical worldview” of the program itself.



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