Meta-levels in Design Research:
Clarifying the Roles we play in Design, Research, and Elsewhere

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Abstract: In discussing design research, we often run into confusions, because all the terms we employ, such as ‘user’, ‘designer’, 'research’, carry many implicit meanings. In abstract reasoning, this leads to mismatches between participants in the discussion. In the area of design tools, ‘designers’ are the ‘users’ of the tools (‘design’ and ‘evaluate’). The confusions are similar to the ones that burden the current development of participatory design techniques and co-creation, where –to a greater or lesser degree- design tools and design responsibilities are given to or shared with end-users of envisaged products or services.

This paper presents a visual scheme meant to help structure the discussion and thinking about the meaning of and relations between design, research, and use. The scheme distinguishes levels of activity in which we find ourselves in different roles: consumers of everyday products, designers of consumer products, tool developers who make design tools, methodologists who devise research/development strategies, and sometimes philosophers considering basic issues such as the hierarchy just described. It helps locate and ‘point out’ a number of key discussion points of current design (research) theory, such as designing for users who are different from the designer, reflective practice, as advocated by Schön, working up users as experts in participatory design. It also helps to clarify how design, research, and use take place at each of these levels. A main conclusion from this, and a recommendation for further discussion of design (research) methodology, is that the terms ‘user’ and ‘designer’ only make sense if explicitly related to the product that is used by the former party and designed by the latter, and that this relation should be made explicit when the terms are used.

Key words: research method, design method, design research, philosophy

1. Introduction
Discourse in emerging fields such as (design) research is difficult because understanding evolves quickly, and we rarely have definitions that are at the same time agreed on, clear, and useful. This paper addresses misunderstandings regarding the roles and activities of the people involved in design (research). It proposes a scheme that organizes these roles and activities, and supports further discussion, not by imposing a strict definition, but by sketching a framework in which meanings can be made explicit.

The motivation for making the scheme comes from my experiences this last decade in supervising research (i.e., PhD projects) by designers (I mean here: people with an MSc in design), in which their design activities are an essential part of generating knowledge (i.e., ‘research through design’). These designers bring a different attitude
and skillset into research, with a greater emphasis on creative, generative, and qualitative research methods, as opposed to the evaluative and quantitative focus typical of conventional scientific research training. At the same time we have seen the design profession evolve, especially regarding the roles of users in the design process. Both these processes are accompanied by frequent discussions about the relation(s) between designing and doing research, and those between the roles of user and designer. Unfortunately, discussions often run aground in vague generalities when the parties involved do not share a clear definition of the jargon they used, and because the discussions were held in abstracto. As a result, it sometimes ends up as a game of 'juggling short words'. One way to improve the situation is to provide and discuss clear examples, as e.g., Brandt & Binder have done [1]. In this paper I propose a tool to assist us in another way, a visual organization of some of the ingredients in the discussion. My aim with this tool is not to provide a definitive definition for the short words, but rather to sketch a map that will facilitate us to clarify what we refer to when we use the short words, in the way napkin sketches can help discussions [2]. Neither should it be taken as the definitive metaphysics of design research. Rather, its aim is to present an overview which all parties in discussions will recognize, with which they may agree or disagree, but especially in which the (dis)agreement can be pointed out (in a literal sense); the latter is especially important if we want to avoid the present day confusions.

2. Confusions
This section sketches a few examples of confusions occurring in academic and design practice, when discussing what we do.

2.1 Activities: is this research or design?
Ianus Keller’s PhD research project [3] dealt with describing ways in which designers use visual materials for inspiration (knowledge goal), and exploring ways in which interactive digital media can support them at this (engineering goal). In this project, a prototype, called Cabinet, was developed and placed in design agencies to study how it would be used. Aim of the prototype is (i) to expose behavior of designers in action so that we can better observe, describe, discuss and explain it; (ii) to explore richer solutions to see if they can improve the current situation. At demonstrations, both academics and practitioners were often impressed by the object of the prototype as tool, and overlooked the research use, asking: “I can see this is design, but how is it research?” Apparently, a physical prototype which can be used outside a strictly-controlled experiment immediately convinces the visitor that this is a useful improvement on the current situation (‘design’). But it does not convey that it is a means to better study the present situation (‘research’). Moreover, the example indicates that people often think of design and research as mutually exclusive activities.

2.2: Roles: How can you be both designer and user at the same time?
A second confusion came from the term ‘designer’ and ‘user’. The researcher (Keller), designed the tool (Cabinet), and in the field tests at design agencies, designers (practitioners) were the users of the tool. They used the tool to support their own design work. So they were designers and users at the same time, but regarding different objects. Moreover, Keller explored the tool also on the basis of his own experience as a designer using visual materials: so he can be seen as the tool’s first user as well as its designer. By themselves, these indications
of ‘designer’ and ‘user’ are clear enough within the context of the case, provided we indicate clearly what the product/tool is that we refer to when we use the term designer or user. If we don’t, we easily get confused.

2.3 Everybody is a designer?
The furniture company IKEA recently launched a campaign ‘everybody = designer’, in order to indicate that everyday people are quite able to make many aesthetic and functional choices. Although this statement indicates that most people are capable of more creativity than the ‘couch potato’ type consumer [4], the simple equation does not do justice to the value of a broad and deep technical education.

2.4 Is not everybody a user? Profession and attitude
Last year at a design symposium in the Netherlands, a designer of good repute told a story of his annoyances with a lot of present-day interface design, saying “I also have bought a VCR, and find I cannot understand how to program it. As a designer I think this should be improved and I just don’t use those functions. But consumers are more willing to invest the extra time to learn to work with a bad design”. What was striking here was that this person seemed to think that ‘designer’ and ‘consumer’ are mutually exclusive existences: that a user (or ‘consumer’) is a different type of person than a designer. Similar distinctions are often made between ‘designer’ and ‘researcher’ as if these two are different types of people.

2.5: Attitudes: Designers can be difficult users
Designers are different from other types of users in that they more than normally curious as to how products work, why they are constructed in a certain way, and how they can be improved. In that sense they are very critical users. We ran into this as a problem with generative techniques [5], giving little creative exercises to designers as a means of exploring their needs and values in the area of cooking. These techniques involved making collages from sets of pre-given words and images, and had worked extremely well with ‘ordinary’ users not burdened by a formal education in making collages. But they could run aground totally when given to designers: instead of ‘naively’ putting together a display about cooking and talk about it, they started to question and criticize the tools, and react on the form of the exercise toolkit rather than the topic of the question. They started interfering with the research.

The above examples are but illustrations of several meanings, both denotations and connotations, that are carried by ‘short words’ such as ‘designer’, ‘user’, and ‘researcher’. Confusions like this arise and linger on when we use them without being clear what they refer to, i.e., which object is being designed, used, or researched, and whether we are talking about a role, a profession, or an attitude.

In clarifying such confusions, formal definitions are not much help, because they shift the burden of clarity to other short words. Taking a clear case, and using it to give instantiations of the meanings can help. Also, making the ingredients of the discussion visible, in the form of a ‘talking sketch’ [2] has proved helpful, often in combination with a case.

In the next section I will introduce a (rather large) version of a talking sketch to support discussions about design and research, and the roles of people in it.
Figure 1 Overview of meta levels in design tools research
3 the scheme

The scheme is shown in Figure 1. It consists of a number of layers, each labeled after the main actor in it, e.g., the product designer whose aim is to design a household appliance.

I refer to the levels as ‘meta-levels’, because at each level, the product of design is a tool for the actor in the level below it. It is called a ‘meta’ level in the sense that it involves a notion applied to itself: a meta-X is an X applied to itself. The classic example of meta-levels is language and grammar. Language is ‘a symbol system used to describe things in the world’. Grammar is a meta-language, because it describes something in the world: language. Grammar is language describing language. And linguists who study language, have developed systems to describe grammars: meta-grammars, a third level.

When we apply meta levels to design, we have users of tools we call products, designers of those products who use ‘design tools’, and people who create those tools, sometimes referred to as ‘design researchers’ or ‘methods developers’. All roles in Figure 1 are given a different name, starting with a unique letter. This is done for convenience in pointing and note-taking, not because these labels are excellent in themselves. Note however, that none of the roles is labeled ‘designer’ or ‘user’ in short. We need those labels at all levels.

3.1 The designer – user – product triangle

Each level describes a designer and a product. The person at the next level down is using that product as a tool to achieve his own ends (see Figure 2). But likewise, the designer is himself the user of a product at the next higher meta level: the design tool or technique. In fact, the triangle designer – product – user can be seen to be repeated from level to level.

Figure 2 Designer-User-Product triangle

3.2 The product designer level

Take for instance the yellow layer labeled ‘product designer’, singled out in Figure 3.

Key elements in the level are
- the person, here labeled ‘product designer’ (P),
- his (design) tool, exemplified by a pencil for sketching, and
- the objective (product), exemplified by a household mixer,

On the level below it in Figure 1 we see the user of the household mixer as the tool to create an objective (a meal), by the person labeled being labeled ‘consumer’ (C). At each of the levels, the same elements return, but with a slightly different content. This shows the parallels between the levels at which we operate. At each level, the scheme visualizes aspects that have entered the academic discussions on design research, design practice, and design methodology in the past decades: knowledge, environment, other tools (more on those follows in section 4 below).
3.3 moving up and down the levels

The scheme shows a total of six levels, at each of which we could find ourselves sometimes. The product designer level (yellow) and the consumer level (orange) are easily recognized. These levels most clearly recognized: at a school of design, it is what students expect to become: professional designers designing everyday products for people at the level labeled ‘consumer’.

But the household appliance is itself a tool used toward creating a meal. The person is labeled ‘consumer’ here may be as creative at making the meal as the product designer is at creating the appliance.

The level above also becomes explicit: to the designer his tools and techniques (shown as a pencil), are means to an end, but to the tool designer one level up (in green) the ‘pencil’ is the end toward which he or she is working. Further levels follow by extrapolating the meta-reasoning: the consumer cooking may be make a meal, but this meal can itself be a means for the host at the ‘life’ level (red level) to entertain his guests. And it may not stop there, if the entertainment is seen as a means to achieve a business deal…

Likewise upward, the tool designer uses certain methods of exploration and research to create his understanding and the tools; these methods in turn are the object of scrutiny and critical evaluation by methods specialists. And these in their turn have to consider philosophical underpinnings of their methods.

3.5 roles and activities

One key element to note is that the people depicted in the scheme are roles, not necessarily different persons. Of course we see specialized professions at each level, as the names suggest. But it may be the same person who, at different times, ponders whether

- the separation of material substance and their properties is a firm basis for organizing our thought about materialization of objects (philosopher).
- testing a CAD program in the laboratory is sufficiently representative of design practice (methodologist),
- there should be more functionality in the CAD tool to replace the pencil (tool designer),
- the forks of the mixer have the optimal shape to match the power of its engine (product designer),
- the dough for the cake should be stirred for much longer (consumer),
- he is serving too heavy a meal to his guests for this occasion (life).

It may even be the same person assuming some of these roles at the same time. In the scheme I deliberately forced different names for the person at each level, and assigned the short label ‘designer’ to none of them, just because we have the inclination to label all these level with ‘designer’. Each of these roles could justifiably be called ‘designer’ or ‘user’, because each of these roles is about designing something, and using certain tools to do that. But if the object-of-design or object-of-use is left implicit, confusion rears its fuzzy head. ‘Designer-of-what? User of what?’ is the key question again and again.
3.4 The designer-user-product triangle revisited

Maybe the most valuable insight from the exercise is that the terms ‘user’ and ‘designer’ should never be used on their own, without explicitly referring to the ‘product’ to which they refer, as in Figure 2. As roles, the designer-product-user triangle exists between each of the levels, so statements such as ‘a designer does this-and-that, whereas a user does such-and-so’ with no reference to the product concerned may be a sign that the speaker (or listener) confuses between the role and the profession of a person he refers to.

Instead, when the coupling is made explicit, we see a triangle of designer-user-product reappearing between each level and the next.

3.5 Relating, or defining?

I am not proposing that the names I have chosen here are the best ones, they are merely handy labels to mark the levels in the scheme. But I am advocating that we are clear about our definitions when we discuss these things.

As an example one may look at the controversies of naming the person depicted at the orange level, the ‘people for whom designers create products’. As Liz Sanders noted [6], the ‘correct’ terminology of referring to these people (or roles) has shifted over the past decades, and each term has been critized as being biased from a specific perspective: customer and client (not the person who will use it), consumer (only interesting until he has spent his money), user (ignoring the needs of bystanders as stakeholders), participant and co-creator (reducing someone to a role in a development process), and everyday people (which for some audiences sounds derogatory). The solution probably lies not in the quest for the ultimate name (several are proposed every year), but rather in being clear what we mean by it. This may require that we make more use of case examples whenever discuss the abstract issues. And, within the abstract discussions, have carrier examples such as suggested by the pictures (I was not proposing that ‘the pencil’ is the designer’s only tool).

4. There’s more to the levels: contexts

In the above presentation I have limited myself to naming the designers/users and their products/tools. The scheme also some other elements that have come into the center of discussions over the past decade, especially with the emergence of new developments of design ethnography and participatory design:

• the situation (environment) in which the action (product designing) takes place,
• other tools that are used in conjunction with the tool mentioned earlier,
• specific areas of disciplinary background knowledge, shown as a stack of books, and
• a thought cloud representing the considerations that the person has at this level.

By placing these side-to-side in a picture, we are triggered to ask ‘what is different between the levels?’, and ‘what is the same’.

4.2 What’s different?

The diagram suggests, in iconic form, some differences in work place style and ways of working, differences in values held at different levels. For instance, we may expect we are more rational at some levels (e.g., about research methods) and more intuitive at others (e.g., about cooking). And we may think that at some levels rationality is required or is a hindrance. These views lay bare the values that we hold if we find ourselves
together in such a field, and it is good to bring these to the fore. Against this backdrop of different levels, the discussion of how design plays a part in research can become a lot clearer.

4.2 what’s the same?

But at the same time, it is also interesting to ask the question: in what are we similar at different levels. An example here is that at each level, we are human, and work within the possibilities of our cognitive repertoire. But although the limitations of human performance are well recognized at the ‘consumer’ level (through human factors guidelines such as ‘print text in high contrast’, ‘keep lists under 7 items for overview’) the same insights seem to receive less attention in the way theories are formulated or scientific presentations are given (I have seen the two example guidelines given before on a slide presentation in tiny letters with 15 items in the list – who’s fooling who?). This is not the place for an exhaustive review of how these levels differ, what the values of practitioners at each level are, what the handbooks of knowledge and methods at each level are. But the scheme does invite use to ask these questions, and pursuing the questions may lead to valuable local answers.

5. Relations between levels: themes

The model helps clarify a number of trends and issues of current design (research) theory, and invites us to apply its notions not only on the level at which they were introduced, but also at the other meta-levels. For example, it helps visualize…

(i) how everyone can be regarded as a designer in some everyday activities, such as cooking; how everybody has an area of expertise which we should tap if, at the level above them, we intend to help them with a design that fits the not-so-obvious needs in their life.

(ii) how reflective practice, as advocated by Schön, involves moving up one meta-level [7]. In reflective practice, the person operating at one level is brought, by reflection, to awareness on the level above. In design education, we intend to teach our students not just to carry out techniques as recipes, but to understand the whys and hows of such techniques to such an extent that they themselves can modify and question them in their practice.

(iii) how working up users as experts in participatory design, as described by Sleeswijk Visser et al [5], does much the same, but at a different meta-level. It brings the user to the level of the designer to facilitate communication; the sensitizing process described there makes ‘consumers’ aware of their needs and values, and turns them into experts who can collaborate with designers on the ‘product design’ level.

(iv) how designing for users who are different from the designer can be difficult. Being an amateur cook can be a benefit if you have to design a kitchen appliance. It can also be a hindrance if you don’t realize you are only an amateur cook.

(v) how certain ‘lead users’, who modify their own tools and can collaborate at the designer level [8] exist not only on the ‘consumer’ level as, e.g., programmers who create new features for their software tools, but also at the other levels, e.g., as designers who are uncommonly aware of their techniques, or researchers who have more grasp of philosophy than most.
(vi) how we hover between two levels if we change our position across the consumer-designer spectrum as presented by Fischer [4]. And that sometimes in doing research we ‘go by the book’, and sometimes we have to innovate on research methods to do good design research.

(vii) how research projects can be at the same time fundamental (aimed at generalization) and applied (aimed at direct, local result), as envisaged by Stokes [9]. Within a research-through-design approach, often a prototype product is developed as a means to learn about the level in question [10]. The essence here is that for design (developing a product) to count as research (developing knowledge), that knowledge – which may be at the meta-level above it – must be communicated with others.

(viii) how design, research, and use take place at not just one, but at each of these levels,

(ix) how at different levels, different paradigms, value systems, and connections to specializations occur,

(x) how some things are the same at all levels, even though that is often overlooked (e.g., principles of good design based on understanding people’s cognitive skills are often applied when designing for the ‘consumer’ level, but are often overlooked in the higher ‘theory’ levels). And finally

(xi) how design discussions may break down if these levels are confused.

Figure 4 shows some sketches as they would typically be made to support and explore these themes. It is beyond the scope of this paper to dwell on the diverse range of issues mentioned above; the point to be made here is only that the scheme helps to support discussing them, although it doesn’t formalize the conclusions of such a discussion.

Figure 4. talking sketches about three ways of design, scribbled over the triangle (they might also be sketched over the scheme of Figure 1, possibly repeated across the levels).

6. Conclusion: limitations of the scheme

Admittedly, the scheme is an oversimplification. Especially at the upper and lower extremes it suggests a linearity which is too simple to do justice to the complexity of design. It highlights how design researchers and other roles people play take place at these levels. And they are not exclusive roles or levels: we all have occupied the levels ‘life’ and ‘consumer’, and some PhD students with an MSc in design will fondly recognize the confusion between ‘product designer’ and ‘tool designer’ level. The levels ‘methodologist’ and ‘philosopher’ are also unavoidable in my experience. We take the former role when we discuss what methods of research do justice to design as an object of study or a method within research [11, 12], or the discussions on what should be the criteria for content of a design-based PhD study (e.g., [1]). We deal with the latter when we run into metaphysical questions on how to define our basic terms, in which I include the difficulties of referring to people, roles, activities, and how they relate. The scheme itself probably belongs on this level. In full knowledge that I have said this before, I repeat that the scheme is not meant as a ‘grand theory’ of design research.

Arguably, as the Germans say “jeder Konsequenz führt zum Teufel” (every consistent reasoning stubbornly repeated will land you into hell), and simple ones can get you there quickly. Instead, it is an exercise in ordering
some thoughts. A sketch, and a preliminary one at that. But one which has proved its value, at least in my
discussions with colleagues and students. I hope that the scheme can function as a starting point to clarify some
of the issues that we run into in our academic (and other) lives.

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