

The Interaction Design Research Triangle of Design Practice, Design Studies, and Design Exploration

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1. Introduction

Interaction design takes a holistic view of the relationship between designed artifacts, those that are exposed to these artifacts, and the social, cultural, and business context in which the meeting takes place. While there is no commonly agreed definition of interaction design, its core can be found in an orientation towards shaping digital artifacts—products, services, and spaces—with particular attention paid to the qualities of the user experience.¹ To be able to deal with user experience—including physical, sensual, cognitive, emotional, and aesthetical issues; the relationship between form, function, and content; as well as fuzzy concepts such as fun and playability—a number of recent efforts have been made in the direction of establishing a better understanding of the role of the user experience in interactive systems design.²

Unlike the Human-Computer Interaction (HCI) community for instance, interaction design fully recognizes itself as a “design discipline” in that its ultimate objective is to create new and change existing interactive systems for the better.³ There is a current plethora of departments, groups, and multidisciplinary labs dealing with interaction design that have their origins in such diverse places as computer science, HCI, anthropology, industrial design, informatics, and applied physics and electronics. Adding to the disciplinary confusion, each group typically also is configured as a multidisciplinary team.

Since the field of interaction design currently is growing rapidly in scope as well as importance,⁴ both within academia and industry, there is an increasing need to also expand, further develop, and professionalize interaction design research. Refined models of interaction design research; embracing both what it currently is as well as pointing toward what it could be, arguably would be very useful tools in this process.

In this paper, we will introduce a model of interaction design research that has evolved at the Umeå Institute of Design, Umeå University, in Sweden in recent years, and which currently is guiding our interaction design research efforts as well as our Ph.D. education. Thinking about interaction design research in the way proposed by the model has helped us to keep up what we see

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- 1 Jonas Löwgren, “How Far beyond Human-Computer Interaction Is Interaction Design?” *Digital Creativity* 13:3 (2002): 186–192; and Terry Winograd, “From Computing Machinery to Interaction Design” in *Beyond Calculation: The Next Fifty Years of Computing*, Peter J. Denning and Robert Metcalfe, eds. (New York: Springer-Verlag, 1997), 149–162.
 - 2 Lauralee Alben, “Quality of Experience: Defining the Criteria for Effective Interaction Design,” *Interactions* 3: 3 (1996): 11; Jodi Forlizzi and Katja Battarbee, “Understanding Experience in Interactive Systems,” *Proceedings of the Conference on Designing Interactive Systems* (2004); and John McCarthy and Peter Wright, *Technology as Experience* (Cambridge, MA: MIT Press, 2004).
 - 3 Daniel Fallman, “Design-Oriented Human-Computer Interaction,” *Proceedings of Human Factors in Computing Systems Conference* (2003): 225–132.
 - 4 John Zimmerman, Jodi Forlizzi, and Shelley Evenson, “Taxonomy for Extracting Design Knowledge from Research Conducted during Design Cases,” *Proceedings of Futureground* (2004).

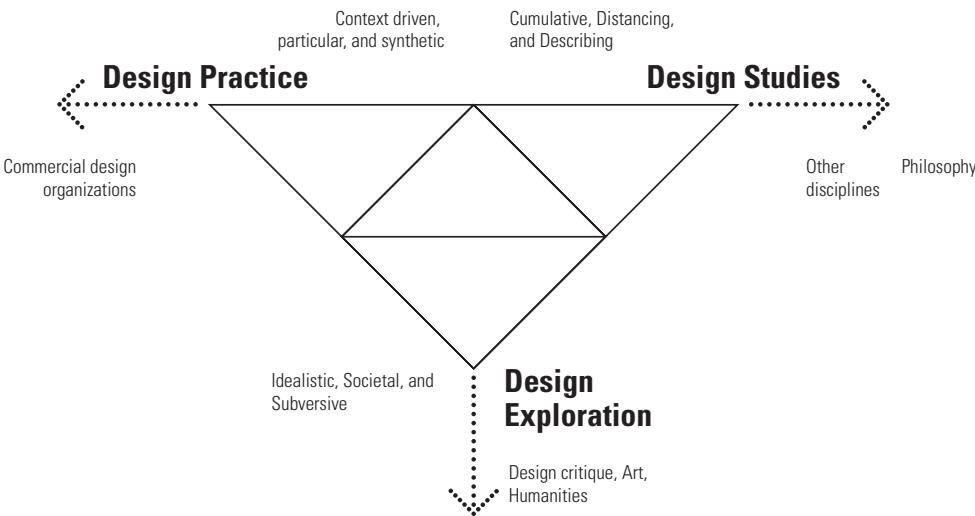
as three vital, external interfaces. First, it leads us to an interface with industry that has facilitated long-term collaborations and an exchange of people. Second, an interface with academia has encouraged staff and students at the design school—many of whom with no previous experience as part of a research community—to travel to conferences, workshops, and similar gatherings to meet others in the field, thus creating and upholding a network of peers vital to the school. Third, the model also reminds us of our interface with society at large, helping us think about interaction design research as having a voice in societal discussions, and in exploring and shaping possible futures (i.e., that industrial design is in fact not something that only concerns the industry).

2. The Model

In its very basic form, the model has the shape of a triangle. This triangle presents a two-dimensional space for plotting the position of a design research activity drawn up in between three extremes: “design practice,” “design studies,” and “design exploration.”

While the actual methods, techniques, and tools being used in these activities can be quite similar, we argue that they are primarily different in *tradition* and *perspective*. These extremes are three different kinds of activities that we believe establish interaction design research as a discipline when taken together. We argue that combining these three activities (i.e., the contingency of the interaction design researcher to take on all three perspectives) distinguishes interaction design research from other disciplines with related interests, including Human-Computer Interaction (HCI), Computer-Supporter Collaborative Work (CSCW), Informatics, Computer Science, Anthropology, Sociology, Philosophy, and so on. The basic structure of our model is visualized as a triangle.

Figure 1
The model of interaction design research
in its most basic form.



2.1 Design Practice

The activity area of design practice denotes the kinds of activities that interaction design researchers are involved in that are very close, and sometimes identical, to the kinds of activities they would undertake when practicing interaction design outside of academia, such as working for a commercial interaction design organization, a consultancy company working with client commissions, or an in-house design department.

We encourage our design researchers and Ph.D. students to take an active part in these practices. An important reason for this is to try to get at the tacit knowledge and competence that are involved in the discussions and critiques that eventually lead up to a final artifact.

In doing so, the interaction design researcher should not be part of the design team as an outside observer, first and foremost a researcher, but rather be part of the design team as a *designer*. The interaction design researcher thus becomes involved in actually putting things together, shaping the form of something new.⁵ This process calls for a certain level of participation and commitment on the researcher's part⁶—involvement and participation in a team effort, and a commitment and engagement to build successful products and services—that is unobtainable by an outside observer.⁷ While design practice clearly develops vital competence, tacit knowledge, and expertise among the designers involved; this combination of know-how and know-that often is confined within the individual designer and the design team due to an oral tradition in design work.⁸

In this activity area, our interaction design researchers become knowingly exposed to the nitty-gritty of interaction design practice, including being part of a multidisciplinary team; learning to communicate with managers, sales people, and engineers; working under strict and suddenly changing budget constraints; negotiating with clients and other stakeholders; and so on. Because it's a design discipline, it is important to realize that activities such as these are just as much part of what interaction design is as actually designing something hands-on.

There is, however, a vital ingredient in the model's activity area of design practice that must not be forgotten for the purposes of design research. When our interaction design researchers work in this area, they must do so with an explicit design research question in mind, or with the clear intent of forming such a question from their activities. The scope of such a research question can range from "reflective" (e.g., firsthand experience with how a particular design technique is used) to "proactive" (e.g., pushing a research agenda, and actively seeking to change how a specific design technique is used). If the goal of a particular project is to design a new, handheld control device for gaming, our interaction design researcher should be part of that project team the same way as everyone else in the

5 Harold G. Nelson and Erik Stolterman, *The Design Way: Intentional Change in an Unpredictable World* (Englewood Cliffs, NJ: Educational Technology Publications, 2002).

6 Richard Coyne, *Designing Information Technology in the Postmodern Age* (Cambridge, MA: MIT Press, 1995).

7 Thomas Nagel, *The View from Nowhere* (New York: Oxford University Press, 1986).

8 Donald Schön, *The Reflective Practitioner: How Professionals Think in Action* (New York: Basic Books, 1983).

team, answering to the same constraints and rules as the rest of the team; and using his or her experience and competence to contribute to a successful result. But interaction design researchers also should have an appropriate design research question, reflecting on the work in which they are currently deeply involved. If successful, such reflection becomes an existential act that will help the field develop a kind of engaged knowledge⁹ that may be inaccessible from an outside perspective.¹⁰

What is important here is that this research question needs not by necessity be a one-to-one match with the general direction of the specific design project. In the above example, for instance, the research question could be product semantics of artifacts aimed at teenagers or strategies to involve children in user studies—but the researcher just as easily could be interested in how a methodological technique (for instance a particular kind of brainstorming) is used in various stages in a design process, or the language game the multidisciplinary team develops to communicate. If the researcher has a proactive research agenda, he or she might employ the team and the content of the project to experiment with a particular kind of brainstorming. Naturally, a more active stance towards research is followed by a different kind of collaboration; one built upon mutual trust between the participants that may take years to achieve.

To summarize the design practice activity area, we see that it is primarily *synthetic* to its character. The interaction design researcher becomes involved and engaged in a particular design practice, but does so with an appropriate research question in mind.

2.2 Design Exploration

Design exploration seemingly is similar to design practice. It also is synthetic and proactive to its character in that the interaction design researcher is involved in bringing forth a product or a service. There are a number of important differences, however, that separate it from design practice, primarily due to the perspective from which the artifact is being constructed. In design exploration, the most important question is: “What if?”¹¹ As a sign of recognition, design exploration research almost always excels in what Schön calls “problem-setting,”¹² and Ehn¹³ refers to as “transcendence” (i.e., exploring possibilities outside of current paradigms—whether these are paradigm of style, use, technology, or economical boundaries).

Yet another sign of recognition is the fact that the typical client in this activity area is the researcher’s own research agenda. These projects often are self-initiated. Design in this area typically is driven neither by how well the product fits into an existing or expected future market, nor based on the observed needs of a group of users. Rather, design becomes a statement of what is possible, what would be desirable or ideal, or just to show alternatives and examples. Typically, work in this area also can be intended to provoke and

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- 9 Ken Friedman, “Creating Design Knowledge: From Research into Practice,” *Proceedings of International Conference on Design and Technology* (2000).
 - 10 Daniel Fallman, “In Romance with the Materials of Mobile Interaction: A Phenomenological Approach to the Design of Mobile Information Technology,” Doctoral Thesis, Umeå University (Umeå, Sweden: Larsson & Co. Tryckeri, 2003).
 - 11 Donald Schön, *The Reflective Practitioner*.
 - 12 Donald Schön, *The Reflective Practitioner*, and Donald Schön, “Designing as Reflective Conversation with the Materials of a Design Situation,” *Knowledge-Based Systems* 5 (1992): 3–14.
 - 13 Pelle Ehn, *Work-oriented Design of Computer Artifacts* (Falköping, Sweden: Arbetslivscentrum, 1988).

criticize a current state of affairs, such as the techno-critical digital art by Dunne and Raby.¹⁴ In this sense, design exploration is a way to comment on a phenomenon by bringing forth an artifact that often in itself, without overhead explanations, becomes a statement or a contribution to an ongoing societal discussion. In this way, the activity of design exploration is clearly linked to some of the ideals of contemporary art, as well as to the interpretative attitude of many humanities disciplines. Design exploration thus creates the necessary space for the interaction design researcher to acknowledge and take seriously the issues of aesthetics.

While suppressed by functionalism for decades, we believe *aesthetics* to be a central concern for interaction design research. Understanding the role of aesthetics means being able to deal with issues of what is beautiful, harmonic, and fitting in the digital world; using synthetic processes that deal in a holistic way with the complex issues that make up a user experience including representation, sense perception, experience, conformance, and infringement, to tradition and culture, materiality, and genre.¹⁵ Particularly when it comes to interaction design research, issues of aesthetics concern not only how something looks and feels, but also the aesthetics of the whole interaction including how something works, how elegantly something is done, how interaction flows, and how well the content fits in. Thus, design exploration is the activity area that allows the interaction design researcher to work with wholes—with complete, dynamic gestalts.

At the other end of the spectrum of design exploration (i.e., closer to traditional research), we have previously suggested that there also seems to be efforts in interaction design research that include synthetic elements as an important driving force but which, at the same time, seem to share many of the ideals of science.¹⁶ For instance, this is the case when the kind of knowledge and user experience sought is the kind that cannot be obtained if design—the bringing forth of an artifact such as a research prototype—is not a vital part of the research process.

In summary, design exploration relies heavily on synthetic processes, but in doing so extensively uses the theories and alternative foundations for design. Design exploration often seeks to test ideas and to ask “What if?”—but also to provoke, criticize, and experiment to reveal alternatives to the expected and traditional, to transcend accepted paradigms, to bring matters to a head, and to be proactive and societal in its expression. Often driven by ideals or theory, design exploration provides what we see as a necessary space for aesthetic concerns in interaction design research. The artifacts coming out of design exploration often are societal in character, and sometimes even subversive.

14 Anthony Dunne, *Hertzian Tales: Electronic Products, Aesthetic Experience, and Critical Design* (London: Royal College of Art, 1999).

15 Lev Manovich, *The Language of New Media* (Cambridge, MA: The MIT Press, 2001); and Richard Coyne, *Designing Information Technology in the Postmodern Age* (Cambridge, MA: MIT Press, 1995).

16 Daniel Fallman, “Design-Oriented Human-Computer Interaction,” 225–232.

2.3 Design Studies

Design Studies is the third activity area of interaction design research, and that which most closely resembles traditional academic disciplines. The overall goal is to build an intellectual tradition within the discipline, and to contribute to an accumulated body of knowledge. This typically involves the design researcher in analytical work, and in taking part in and contributing to ongoing discussions about design theory, design methodology, design history, and design philosophy. This also is where influences from other disciplines are most visible, for instance working together with social scientists and experimental psychologists, and by directly referencing and adopting other disciplines' techniques, practices, and theories. The main arenas for this kind of work include conferences, workshops, and other gatherings, as well as locally by organizing reading circles and group discussions.

Most activities in this area strive to be part of "[a] systematic inquiry whose goal is knowledge of, or in, the embodiment of configuration, composition, structure, purpose, value, and meaning in man-made things and systems."¹⁷ As such, design studies could be seen as "the sciences of the artificial."¹⁸ But taking off from Simon's suggestion that "everyone designs who devises courses of action aimed at changing existing situations into preferred ones,"¹⁹ Ehn notes that, in order to learn what Simon has in mind with "preferred situations," one has to consider and integrate into any science of design typical subject matter of the human sciences. including issues of authority, power, control, and labor, and in what social and historical settings a particular design effort takes place.²⁰ The behavior of neither the individual designer nor the organization in which a design process takes place can be suitably captured by a science only of the artificial.²¹

Interaction design, like all design disciplines, thus resides in people, methods, processes, and artifacts. Activities in this area therefore are centered on issues such as "construction as a human activity" (i.e., the study of how designers work, think, and carry out design activity, including the study of the methods and processes designers use); "how designed artifacts perform their jobs" and how they work; "the study of the artifacts that are produced" (i.e., how an artificial thing appears and what it means),²² following Cross's model of design epistemology, praxiology, and phenomenology.²³ To this, we might also add an interest in understanding the context of an artifact.²⁴

To summarize this activity area, we note that it, unlike design practice, seeks the *general* rather than the particular, aims to *describe* and *understand* rather than create and change, and because of that often appears as *distancing* to its character rather than involving. Design studies, unlike both other activity areas, generally strive to form a *cumulative* body of knowledge.

17 L. Bruce Archer, "A View of the Nature of Design Research" in *Design: Science: Methods*, R. Jacques and James A. Powell, eds. (Guildford, UK: Westbury House, 1981).

18 Herbert A. Simon, *The Sciences of the Artificial* (Cambridge, MA: MIT Press, Third Edition, 1999).

19 Ibid.

20 Pelle Ehn, *Work-oriented Design of Computer Artifacts*.

21 Richard Coyne, *Designing Information Technology in the Postmodern Age*.

22 Nigan Bayazit, "Investigating Design: A Review of Forty Years of Design Research," *Design Issues* 20:1 (2004): 16–29.

23 Nigel Cross, "Design Research: A Disciplined Conversation," *Design Issues* 15:2 (1999): 5–10.

24 *Computers and Design in Context*, Morten Kyng and Lars Mathiassen, eds. (Cambridge, MA: MIT Press, 1997).

3. Moving In-between Activity Areas

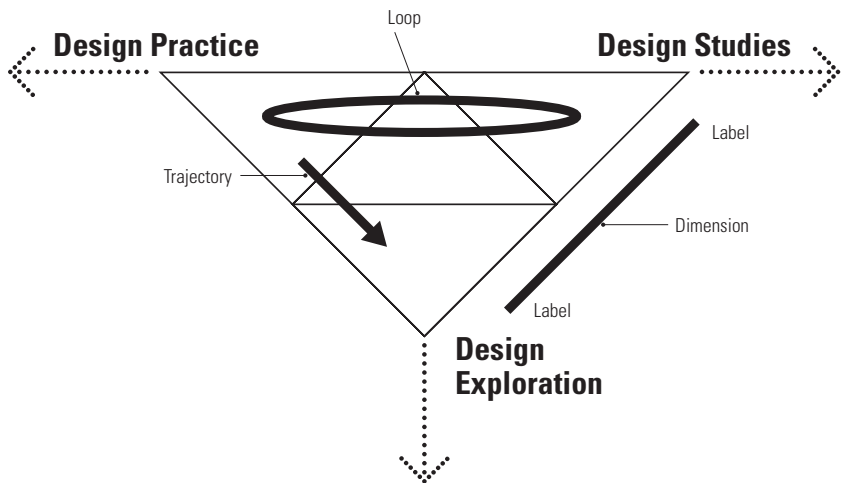
In our use of the model, we believe the most interesting and rewarding results in interaction design research come not from taking a specific position in the model, but rather from moving or drifting in between different positions. While the actual methods, techniques, and tools that are being used in each of these activities can be quite similar at times, we argue that the activities primarily are separated in terms of perspective and tradition. Thus, moving in between different positions in the model is, more than anything else, a *change of perspective*—using a different set of goggles.

Acknowledging the three activity areas of design practice, design exploration, and design studies, and understanding how they differ in terms of perspective and tradition, is crucial for establishing interaction design research as a discipline. We argue that the ability to move in between all three areas in a controlled way distinguishes interaction design research from other research disciplines with related interests in interactive systems including Human-Computer Interaction (HCI), Computer Science, Informatics, Anthropology, Sociology, and Media Studies.

We believe that being able to move in between different parts of the model (i.e., dealing with all three perspectives and the tension that occurs between them) also is what makes interaction design research fresh, innovative, and unique.

To be able to discuss and elaborate further on tensions and movement in the model, we have introduced three concepts that together form a simple notation that can be used with the model: trajectories, loops, and dimensions.

Figure 2
Trajectories, loops, and dimensions.



3.1 Trajectories

First, trajectories refer to either sought moves or unwanted drifting in between two or more activity areas in the model, and are drawn as simple lines with arrows to indicate direction. Trajectories also can take place inside of a single activity area, for instance, to indicate subtle changes and tensions occurring in a project.

We have found the notion of a trajectory to be a useful tool for making explicit what kind of perspective a certain project has, and what kind of quality measures, guarantors, and stakeholders we will face when moving in between different activity areas.

3.2 Loops

Loops, as the name suggests, are trajectories without either starting or end points that move in between different activity areas. As previously argued, loops are crucial in that they represent what sets interaction design research apart from other research: the ability to move freely between design practice, design exploration, and design studies. Loops are the notation we use to think about, plan for, and afterwards explain these movements.

As a general scheme, we set up most research efforts and Ph.D. student projects in the form of loops in between at least two of the activity areas. Since the activity areas denote a change in perspective more than a change in actual practice, loops should not necessarily be thought of as occurring sequentially in time. On the contrary, in a loop between design practice and design studies, for example, the two activities often transpire and feed into each other, rendering them almost inseparable. In design practice, a researcher takes part in a design practice project, typically working in a team with industry constructing an artifact. Wearing the design studies goggles, the researcher forms an explicit research question by reflecting on previous experiences, issues, and challenges arising in his or her current design practice project; and also by taking part in conferences and workshops, reading design research literature, discussing with colleagues, etc. With the research question in mind, the researcher is able to put on the design studies goggles to reflect on what is going on in the design practice project.

In our experience, explicitly drawing this complex process as a loop in the model seems to help people realize and think about what goggles they should be wearing and when. Similar loops can be drawn between design exploration and design studies, as well as between design practice and design exploration. In some cases, a loop can cover all three activity areas.

3.3 Dimensions

A dimension is a conceptual subset of the whole model that connects and creates a one- or two-dimensional continuum between the activity areas. Dimensions are what come to charge the whole model with meaning by creating tension between the different activity areas.

Unlike trajectories and loops that appear inside the triangle model, and represent our activities as interaction design researchers, we generally tend to draw dimensions outside of the actual model to stress that they are conceptual extremes. These end points are labeled with descriptive words or symbols.

While obviously there are an infinite number of dimensions one could think of, a specific issue discussed within the framing of a specific situation within a specific project usually limits the number of dimensions that are relevant to consider at that time. Using simple bipolar dimensions in this way has become a way for us to work with and charge our work with theoretical content in quite a practical way. For us, dimensions have become a very useful and powerful tool in which to introduce design theory to the discussion in a practical, situated, contextualized, and meaningful way.

As an example, one such extreme bipolar dimension we frequently use is between design practice and design exploration. Here, we usually label the first extreme with a dollar sign, describing the extreme corner of design practice—design in service of a client, that entails a whole set of concerns and limitations ultimately guided by how well the product performs at a specific market—and the extreme of design exploration as a sun appearing behind a cloud—ultimately guided by visions and ideals about how things should or could be (i.e., design as providing an alternative future).

A similar dimension can be found between design practice and design studies, but here between what is “real” and what is “true.”²⁵ Design practice is about creation and change, to make things work and sell. To be able to do so, design practice needs to be *real*, in that it must pay attention to and often adhere to commercial aspects, cost, time to market, sales figures, other products in the market, an existing model line, user preference, and so on. The perspective of design studies on the other hand, again in its extreme form, is to seek to understand, explain, and predict—ultimately directed towards what is *true*, however as locally as that true may be.

A simple example may enlighten this very important difference in perspective of these two activity areas. While computer keyboards have always used the QWERTY layout of the early typewriters, when it was necessary to physically separate frequently used keys to prevent mechanical jams rather than to provide efficient user input of text. Research (seeking what is true) has shown repeatedly that many other layout models for keyboards, such as the Dvorak configuration, significantly increase typing speed after a short learning period. Alternative layout models for computer keyboards have done very badly in the market, however, so designers of keyboards (which need to be real) keep designing keyboards using the QWERTY layout. The main point here is that it is negligence neither on the part of the researchers nor the keyboard designers (i.e., not knowing what is true or what is real) that is the problem. Rather, it is a difference in fundamental *perspective* and *tradition* that sometimes

25 Harold G. Nelson and Erik Stolterman,
The Design Way.

renders them incommensurable. While design studies may call attention to the fact that alternative keyboard layouts provide more efficient input, design practice typically needs to deal with the fact that QWERTY keyboards are what sell.

A number of dimensions and tensions such as these arise within the model. Some can be been adopted directly from design theory literature, including work by Nelson and Stolterman,²⁶ Ehn,²⁷ and Schön.²⁸ Other dimensions have been developed out of perceived differences in world-views among designers and researchers in and around the area, while a third source has been our previous experience in practice, research, and teaching. While far from a complete picture, a few of these dimensions are summarized below as examples of the kind of discussion that can come out of the model:

True—Real—Possible. If design practice needs to be concerned with what is real and design studies with what is true, design exploration instead seeks to show what is possible; to show an alternative future; and to transcend current paradigms.

Judgment/Intuition/Taste—Analysis/Logic. The form given to a specific element of, for instance, a logotype is due to the designer's judgment in the specific design situation—based on his or her competence, intuition, experience, and taste—in a complex conversation with the material.²⁹ This is quite dissimilar to design studies, where neither decisions nor results—at least in theory—can come from sources such as judgment, experience, and taste. If they did, almost by definition, they would not be regarded as scientific.

Tradition—Transcendence. This dimension concerns the tension between extending and improving already established products or ways of working and thinking (i.e., rooting one's design in an existing tradition), and exploring a possible future by transcending (i.e., breaking down and going beyond) the boundaries of an existing design paradigm.

Particular—Universal—Ideal. Design practice often deals with the ultimate particular. A specific design project has a set of requirements and constraints that are specific to the situation, and the outcome of the design project is a product or service that also is particular. An interaction design project may, for instance, result in a mobile phone that has a particular shape, a particular name, a particular brand, etc. (i.e., the ultimate particular). Design studies, on the other hand, often have less interested in the ultimate particular, but rather in what the general aspects, issues, and elements are shared by a group, or all, mobile phones. Third, design

26 Ibid.

27 Pelle Ehn, *Work-oriented Design of Computer Artifacts*.

28 Donald Schön, *The Reflective Practitioner*.

29 Donald Schön, "Designing as Reflective Conversation with the Materials of a Design Situation," 3–14.

exploration would be likely to pose another question altogether—what qualities would an ideal mobile phone embody?

Create/Change—Explain/Understand—Suggest/Provoke.

Striving to create and change implies that design practice is a proactive activity of creation and intentional change. In design studies, the researcher instead aims to better understand a phenomenon to be able to explain and predict it. While design practice aims to change, and design studies aim to explain, design exploration—owing to its transcendental character—on the contrary often aims to suggest alternatives, problematize, criticize the current state of affairs, and provoke.

Client—Peers—Critics. The role of the guarantor (i.e., the body guaranteeing the quality and validity of the work), typically is quite different between the three activity areas. While design practice tends to emphasize the role of the client and various business goals in this process, design studies usually relies on peer reviewing to guarantee good quality. When it comes to design exploration, the answer is not straightforward. Other design fields such as architecture and graphical design have recognized design journals that publish design critiques. Such a tradition is yet to be established in the interaction design field.³⁰

30 Olav Wedege Bertelsen and Søren Pold, "Criticism as an Approach to Interface Aesthetics," *Proceedings of Third Nordic Conference on Human-Computer Interaction* (2003).

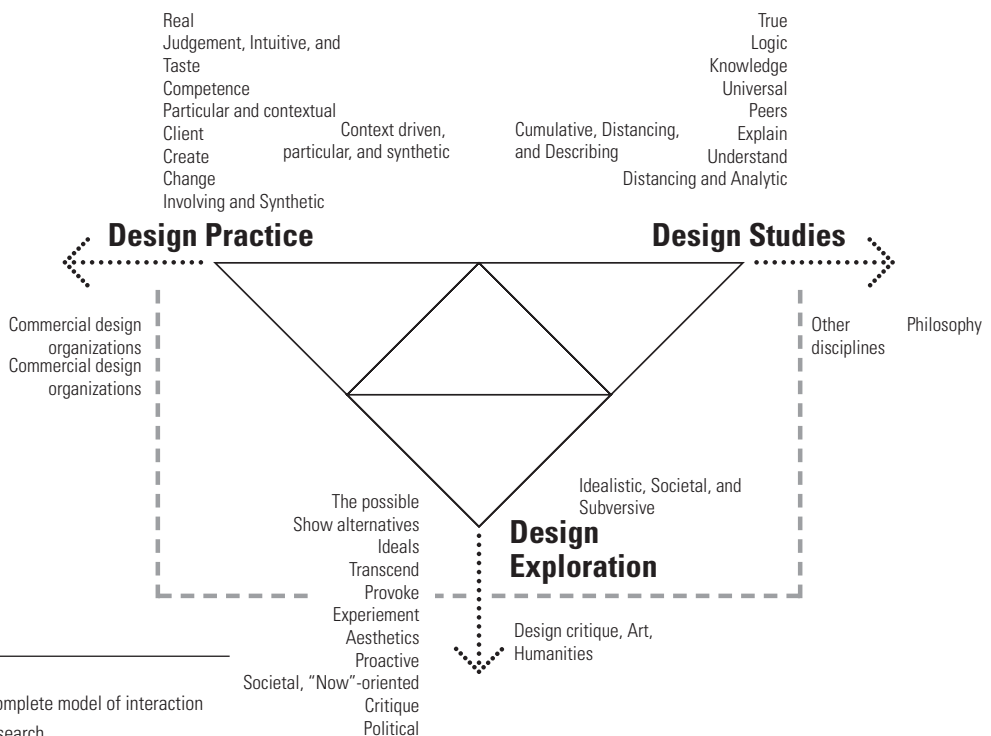


Figure 3
A more complete model of interaction design research.

4. Using the Model

How can the model presented in this paper be used in practice to stimulate reflection and discussion in the area of interaction design research? How does it relate to other models of design and design research?

We have been using the model for a few years, exposing it on a regular basis to all design researchers and Ph.D. students. In this way, our use of the model has become more or less omnipresent, and has helped to form our understanding of design research, providing us with a common ground. Some of the ways in which we have found the model useful include:

- *Discussing specific design research projects.* The model also is useful for discussing projects when the design team is multidisciplinary, and may consist of members from collaborating companies and/or other academic disciplines.
- *Discussing longer design research efforts.* The model can be used as a background to discuss the layout and plan of a longer research commitment, such as a Ph.D. thesis.
- *Plot a research group's current projects.* What kind of projects are our group involved with at the moment?
Is there a clear center of gravity in any of the three activity areas and, if so, is that a desirable situation?
- *Differentiate between quality measures.* Projects appearing in the three different activity areas all need to have different quality measures. When is a project successful? Who is the guarantor of quality?
- *Differentiate between various kinds of contributions and deliverables.* What kind of contributions can we as researchers expect to give, as well as expect others to provide? What should be regarded as satisfactory output from a given activity?

5. Situating the Model

The model presented in this paper has evolved over a number of years, and can be seen as an extension of our previous work and that of others. There is a current tendency in many disciplines, and not only the explicit design disciplines, of moving from more traditional forms of research studies—attempting to describe and understand—to proactive research, to strive to change and create something new. In HCI, for example, researchers are not primarily studying the usability of existing styles of interaction or interface solutions. On the contrary, one of the core activities in contemporary HCI is the design of novel technologies, often called “prototypes,” which act as vehicles through which the researchers’ ideas for novel and alternative solutions materialize. To shed light on this tendency, we earlier pointed out what we saw as two different kinds of conducts in HCI. First, we suggested “design-oriented research”—where research is

the area and design the means—as a means of producing new knowledge by involving design activities in the research process. Here, design drives and propels research. Second, in “research-oriented design”—where design is the area and research the means—the creation of products, and in the process answering to the problems and real-world obstacles one encounters, is the primary objective. Research is what drives and propels design.³¹ While this model sometimes has been interpreted in such a way, we never intended it to provide anything like a complete picture of a preferred situation when it comes to design research. On the contrary, it was meant to be a concrete tool to suggest, analyze, and discuss what appeared to be two competing and sometimes incommensurable traditions within the field of HCI.

There are a number of other models of interaction design and design research to which the model presented in this paper needs to be compared. While there is not space here to comment on all in detail, a few of these need special attention. We already have briefly mentioned Cross’s³² classification of design research as being primarily concerned with the three categories of “design epistemology,” the study of how people design; “design praxiology,” the study of design methods, techniques, and processes; and “design phenomenology,” the study of the artifacts that come out of design processes. Several other models try to deal with the different kinds of inquiry that seems to exist in design research; acknowledging that design research seems unusual in being understood both as an intellectual discipline as well as an applied discipline. Friedman³³ suggests four areas that a progressive design research program needs to address; the philosophy and theory of design, research methods and research practices, design education, and design practice. In his overview of design research, Roth³⁴ discloses some of the different kinds of inquiry that seem to exist in design research from the very concrete and specific to the more conceptual, theoretical, and even philosophical and contrasts the use of qualitative and quantitative approaches. Buchanan’s³⁵ classification scheme includes what he calls clinical, basic, and applied design research. Sato³⁶ notes that the interest of design research is twofold—in understanding the acts of design, and in understanding the subjects of design.

With the exception of these models and a few others, one of the largest current problems in design research in general—and possibly interaction design research in particular—is its failure to develop strong models (i.e., sustainable theory out of its own practice). Especially among designers, there sometimes is a tendency to place design on an equal footing with research (i.e., to say that design practice is more or less the same thing as research, and thus that such things as traditional theory construction in the field are not really necessary.

In relation to our model, the tradition and perspective of Cross’s categories belong to the design studies activity area, since

31 Daniel Fallman, “Design-Oriented Human–Computer Interaction.”

32 Nigel Cross, “Design Research: A Disciplined Conversation,” 5–10.

33 Ken Friedman, “Creating Design Knowledge: From Research into Practice.”

34 Susan Roth, “The State of Design Research,” *Design Issues* 15:2 (1999): 18–26.

35 Richard Buchanan, “Wicked Problems in Design Thinking” in *The Idea of Design*, Richard Buchanan and Victor Margolin, eds. (Cambridge, MA: MIT Press, 1996): 3–20.

36 Keiichi Sato, “Perspectives of Design Research: Collective Views for Forming the Foundation of Design Research,” *Visible Language* 8:2 (2004): 218–237.

they are describing their character, and suggests the research take on an observer's perspective. Some of the other models acknowledge the role of practice, but tend to regard design practice in terms of the clients of design research. In contrast, our model suggests that an important part of the design research process is allowing the researcher to change roles and perspectives (i.e., to step out of the scientist's view from nowhere).³⁷ Notwithstanding the need for proper studies in the categories above, we believe that allowing first-person perspectives to enter design research has the potential to provide findings unattainable with only an outside perspective, and thus add significantly to the overall quality and the relevance of design research.³⁸

While most of the above-mentioned models point out the dialectics between what we call design practice and design studies, few seem to appreciate the third end of our triangle, design exploration. In contrast, we believe that the aesthetical and transcendental concerns this end of the spectrum represents are central in understanding design research, perhaps especially so for interaction design research because of its sometimes close resemblance to other, seemingly similar areas of research, such as HCI.

Furthermore, the efforts in the activity areas of design exploration and design studies reveal things about the nature of interaction design that appear to be unattainable from within design practice, since they provide alternative ways of approaching knowledge construction, ask a different set of questions, and give the design researcher very different perspectives. Taken together, however, we argue that thinking about research in interaction design in terms of going back and forth in between the three activity areas presented above provides some initial steps towards separating interaction design research from other kinds of research in the neighborhood of designing interactive systems.

6. Conclusions

Our model's emphasis on interaction design as a design discipline accentuates the importance of incorporating and addressing typical design questions such as the role of the client, the parallel emergence of question and answer, aesthetical issues, and design as about presenting possible futures into the scope of interaction design research.

One of the most rewarding effects of the model has been the way it has helped to establish a kind of pidgin language (i.e., steps towards a common ground) in our organization around issues of research in interaction design; inclusive of some kind of agreement about interaction design research means to us; why we have it; and what it could be. For us, this model has made people talk, challenged preconception, helped us see things, and stimulated discussions.

To conclude, we argue that a somewhat greater benefit of using this model is that it supports the three vital interfaces that we

37 Thomas Nagel, *The View from Nowhere*.

38 John McCarthy and Peter C. Wright, *Technology as Experience* (Cambridge, MA: MIT Press, 2004).

see as central to interaction design research, and that helps to distinguish what is unique about interaction design research compared to other communities of practice in and around the area of interactive systems design.

First, the activity area of design practice provides the “interface towards industry.” This interface recognizes and acknowledges long-term collaborations, joint projects, and the exchange of people between interaction design research and industry. It also is important because it directly links interaction design research with industry-relevant questions and concerns. This interface thus increases the chances of upholding and starting new collaborations; finding new industry partners through a larger network of contacts; the opportunity for industry-financed doctoral students; and as an aid to students in finding external exam projects, internships, and eventually jobs in industry.

Second, the activity area of design studies provides “an interface towards academia.” Conducting work in this area means building an academic and intellectual tradition within the organization. This entails making space for reflections in some kind of structured way on one’s activities; organizing reading circles and seminars; and opening up arenas for theoretical, methodological, and philosophical discussions to take place—as well as traveling to conferences, workshops, and similar gatherings to meet others in the field; to learn what is new and coming; and to uphold a network of contacts and peers. Naturally, this interface also is where influences from other disciplines enter into the field. The interface towards academia thus grounds interaction design research within the larger topology of research disciplines.

Third, design exploration provides “an interface towards society at large.” Based on our experience, there appears to be inherent power in materializing or “thingifying” one’s ideas, sketches, and thought experiments into dynamic artifacts, whether or not these turn out to be products, services, or spaces; and communicate these not only to academic groups and industry, but also to use whatever channels are available to become a voice in societal discussions and thus in shaping the future.

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