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Human Computer Interaction (HCI)

Towards a Critical Research Position

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The ongoing development of digital technology creates new, immensely complex environments that deeply influence our lifeworld. This paper is about the ways in which HCI (Human Computer Interaction) research and other information technology disciplines can contribute to a deeper understanding of technology and the ongoing transformations of our lifeworld. As such, the paper is a conceptual exploration driven by a sincere striving for the possibility of making a real difference to the way research is carried out on the societal influences of digital technology. The paper is based on the assumption that there are some foundational decisions forming any research endeavor: *the question of methodology*, the question of *object of study* and most importantly – the question of *being in service*. We explore and propose a *research position* by taking a critical stance against unreflective acceptance of digital technology and by acknowledging people's *lifeworld* as a core focus of inquiry. The position is also framed around an empirical and theoretical understanding of the evolving technology that we label the *digital transformation* in which

an appreciation of *aesthetic experience* is regarded to be a focal methodological concept.

Research in Service

An ultimate concern of most people is to have the opportunity and capacity to live a 'good life'. What might constitute a good life is, of course, as difficult to define as to characterise what are universal human needs and desires. The 'good life' is a concept of the same richness and diversity as the cultures and individuals on our planet. Nevertheless, we will argue that research on the interaction between humans and digital artifacts should, as one of its intentions, try to create and establish knowledge that can help people understand and reflect on their place and situation – their *lifeworld* – in the midst of an ongoing technological 'revolution'.

We argue that the majority of contemporary research in the fields of information technology is radically changing our everyday lives without taking responsibility by making the underlying values and ultimate goals of their efforts visible and open for critique. We argue that there is a need for research aimed at revealing the way digital artifacts change the preconditions for life and how it influences the way we perceive and think about our world.

'We' or people are, of course, not *one* entity with the same needs and desires, there is a plurality when it comes to the way technology influences our lives. However, we are making the argument that human computer interaction research (HCI research), and technological research in general, already and always acts based on a research agenda. We also believe that this agenda is often grounded in non-reflective assumptions about the ultimate purpose and direction of the research. There is a lack of critical research that challenges any 'non-reflective agenda' among those involved in developing new technology.

Human computer interaction research should, as a major actor in the development of new digital artifacts, explore, experiment, test, analyse, examine, explain and reflect on how digital designs can serve the striving for the 'good life'. We argue that such a choice, even if vague in what it entails, would drastically influence the way research is carried out. We also argue that such studies should not be handed over to other disciplines. Information technology researchers and especially HCI researchers have, in many cases, the necessary *double competence* in the technological development as well as in the theoretical advancements within social and cognitive theory. HCI researchers together with other researchers in the field of information technology need to decide what and whom they are serving with their research, and what the ultimate aim and purpose with their research is.

An HCI researcher is always 'in service' of someone or something. In the tradition of 'pure' science, ideally a researcher should be in service of 'truth' and should do this by producing

'true' knowledge. Our contemporary research environment is however more complicated due to a long and intricate questioning of truth as the only objective and final goal in research. To have truth as the 'client' in research has over time been complemented with other potential 'clients'. There is a growing awareness that contemporary HCI research is not necessarily informing us, as ordinary citizens, in our struggling attempts to live a good life.¹ Rather, HCI research seems to be focused on other clients and outcomes, such as organizational and/or personal efficiency and improvement, or detailed technological solutions to more specific, narrow, real or imagined problems, or in some cases, it is focused on the invention and creation of new artifacts as a way to explore new technology. The choice of 'client' implies and influences what the researcher will consider as a 'problem' and a 'result'.

We argue that a neglect of the 'big' issues leads to a situation where ordinary people cannot get any help in *their* attempts to understand and make meaning of their rapidly changing *lifeworld*. As a consequence, researchers and designers are often blamed for the creation of artifacts that in a 'bad' way influences societal development, leading to stress and bad health. It seems as if, even though digital technology is mostly assumed to be a solution for prosperity and continuous development,² people also hold digital artifacts to be bearers of something that contradicts what they see as the core of a good life.

So, despite the almost unanimous praise of new technology, there exists skepticism about technological artifacts and developments.³ For instance, digital technology is to most people seen as a necessary part of their lives and as a practical tool for everyday activities – helping us communicate with friends, families, organizations, government, etc; allowing us to create and manipulate texts and images; facilitating financial transactions; providing entertainment and so on. At the same time, digital technology is seen as a cause of increased stress and of hectic lifestyles that lack time and place for privacy and reflection. Underlying both the 'good' and 'bad' consequences is the fundamental idea that digital technology affords a world without limits, and provides us with the possibility to be anywhere at any time while being able to access anything or communicate with anyone. So, while there is a strong acceptance of digital technology, there is also a fear that it will push us into a way of living that we cannot handle or really don't want.⁴

This paradoxical relation to technology should have consequences for HCI research. The challenge, or at least *one* challenge, for that research should be to produce knowledge that can help people understand and possibly create an environment that is in line with their own needs and desires. This does not mean that the research should deliver solutions. Research should instead develop ways of thinking that makes it possible for people to reflect and critically examine the technologies in their lives. We believe this challenge

to be one of the most important tasks today for HCI research. We also believe that such a challenge must be approached as a critical and emancipatory project, since:

...the critical analysis continues to insist that the need for qualitative change is as pressing as ever before. Needed by whom? The answer continues to be the same: by the society as a whole, for every one of its members.⁵

This paper is a conceptual exploration based on and initiated by years of struggling with the fundamental issues here discussed. We have, as researchers, devoted time and energy to conduct research that through its purpose and by its activities manifests the research position portrayed throughout this paper. Our empirical work is not here reflected in our argumentation, but to us, it serves as a stable ground for the theoretical and conceptual 'adventure' presented here. Our hope is that we one day will be able to formulate the work in a more 'methodological' and 'simple' form, but as for now it is in the form of intentional and explorative *theorizing*.⁶ Our work is driven by a sincere desire to make a real difference to the way research on how technology, and especially digital technology, influences our society, is carried out.

We are also convinced that this challenge cannot, by its very complex nature, be reduced to simply a question of research methods or techniques. It demands a creative design of the very foundation of HCI research. Such a design can be labeled as a fundamental *research position*. The position we will argue for is basically that we need a balancing critical stance against unreflective acceptance of digital technology, or in other words, that there is a real need for *design critique* within HCI research. This position is grounded in the acknowledgment of the supremacy of lifeworld as a core focus of inquiry and also framed around an empirical and theoretical understanding of the evolving object of study for HCI research. Finally, an appreciation of the notion of *aesthetic experience* as a focal concept is also fundamental to the proposed position. This outline is also the basic structure of this paper.

Establishing a Research Position

Over the last few years there has been an intensified debate on the status and future of human computer interaction as an academic research discipline.⁷ Contributions to this debate have focused mainly on the question of whether HCI research is, or has the potentiality of becoming, a stable scientific field with a core of more or less accepted theories and accumulated knowledge. One basic question is whether or not HCI research has a unique object of study that distinguishes it from other closely related fields. There has also been a debate over what should be seen as

proper approaches.⁸ Some have argued for a stronger tie to ‘real’ scientific methods and approaches, others have moved towards more designerly approaches.⁹

Today we may find a broad mix of methodological approaches represented in the most prestigious journals and conferences. These debates can be seen as signs of a healthy dialogue around some core issues concerning the very nature of research. Each of these debates slowly builds a common understanding of what makes the field a distinct and unique research discipline. Even though these debates are constructive, they will never lead to a total unity of what truly is a research field. There will always exist a diverse set of perspectives on what the field is or should be. We see this situation as healthy and are not advocating a unified perspective or a universal approach. We recognize that each approach has its strengths and weaknesses; instead we want to draw attention to the *purpose* of HCI research.

Our argument is based on the assumption that there are some foundational decisions forming any researcher’s work within a field. We have mentioned two of them already, *the choice of methodology* and the choice of what constitutes *the primary object of study* of the field. These two choices are commonly seen as inescapable for any researcher. We will also address a third choice, and that is the *choice of service*, that is, the question of whom or what do we serve with our research. It is important to remember that researchers are already and always making these decisions, even though in many cases, not consciously or deliberately. Being a researcher and being part of a larger research community with an established research paradigm can lead to a situation where the individual researcher does not have to take on these larger questions since they are ‘handled’ by the dominating paradigm and the established tradition. This is also the case in HCI research.

HCI research has mainly seen itself as serving the needs of some traditional major clients. These clients have, over time, varied somewhat, but are by and large, *users*. The user’s acceptance of a design is usually seen as the ultimate goal or verification of HCI research. The user, is however, a concept extraordinarily vague and diverse. In most cases, when ‘the user’ is posited as ‘the client’ of research, they are actually a surrogate client. The ultimate client is, in most cases, the organization within which the user is either employed or related to, as a customer. Another more well-defined client has been the practicing HCI *professional*. There is a tacit agreement between HCI researchers and HCI professionals that they are more or less one of a kind. This is a confusing view which has led to serious misunderstandings, on both sides, of their roles and their relationships. It has lately been advocated that *being in service* constitutes a distinct kind of relationship.¹⁰ If such a relationship is taken seriously, any decision of who is the major client of research outcomes, establishes a clear *position* for HCI research. Such

a position makes it possible to see what the overall purpose of the research is; it gives direction and intention to research activities and decisions in that it governs what should be studied, why it should be studied and what should be looked for. And maybe most important, it brings on a *value system* by which the research outcome can be measured and judged as valid and valuable or not.

When a researcher decides on how to relate to the three choices we have mentioned, that is, the *methodology*, the *object of study* and whom to *serve*, a unique *research position* is created. Even though there are several kinds of positions in HCI research today, we claim that the space of possible positions is far from being fully explored. We also claim that some of the positions, presently not commonly explored, are of vital importance to our field and to our society. In this paper we propose and investigate one possible research position for HCI research. It is not a position that should be seen as the only one, but one that to a large extent is missing and would be a complement to existing contemporary research positions.

The basic idea of our proposal is that one of the most crucial challenges for HCI research today is the *study of the overall effects of the ongoing digital transformation*. This research challenge has to be accepted on behalf of humans not in their role as users, customers, leaders, or any other role, but as humans living a life. We argue that HCI research has an obligation to study the way digital technology changes the preconditions for the “good life”. Since digital technology is more or less fully accepted as the way to improve organizations, society and the life of the everyday person, we believe there is a need for an intentionally critical position. We argue that HCI research must accept the challenge to break the “one-dimensionality” in the understanding of digital technology.¹¹ Even though we see this as a critical undertaking, it is at the same time a sincere way to *reveal the potentiality* of technology and the way it positively can influence people’s experience of their total lifeworld.

The position we argue for is based on the assumption that the digital transformation is at the core of the object of study for HCI research. As such, instead of examining digital technologies as separable or defined along one single dimension, researchers should consider them as being a part of a greater whole. This is also expressed in some recent theories framing technological development as information ecologies, collective intelligence and actor-networks, which are more sensitive to the various ways in which digital technology is entering our lives.¹²

The position we propose is also based on the assumption that we have to serve the *common good*, expressed and manifested in the way people live their everyday lives. The approach we propose is influenced by *critical theory*, with the notion of the *aesthetic*

experience as a focal concept¹³ and it ascribes fundamental importance to the ways in which people appropriate digital technology in their everyday life; the advocated approach considers people as important participants of the digital transformation through their subjectively and individual meaning-making processes.

To reach our purpose we will make the case that people's lifeworld is influenced by a combination of two transformational processes: *the digital transformation* and *the device transformation*. We will argue that research on digital artifacts and systems are, due to these transformations, facing new degrees of complexity that demand new tools for understanding – and thereby create new demands on research methodology.

The Evolving Object of Study

We are living in an ever more digital world. In that sense, we are living in an artificial world, that is, a world made by humans. The crucial and large designs created by human beings, such as the market economy, religions, nation states, governments, educational systems and the various professions have a huge impact on the way our lives are, and can be, lived. We are witnessing a rapid transformation of these large-scale designs, made possible by digital technology.

When it comes to physical objects, we are used to separating things from each other. To most people there is no real connection between the design of a kitchen chair and the payroll system at work. And there is no real relation between the TV in the living room and the form you fill in at the bank. All of us, in our everyday life and language, separate particular objects and systems in order to be able to talk, discuss and argue about them. At the same time, at an intuitive level, most people acknowledge the idea that our lifeworld is only one, and as such, always perceived in a holistic and immediate way.¹⁴ This intuitive understanding of our reality is further developed as a philosophical school of thought in phenomenology.¹⁵

This everyday and intuitive belief does not align with the scientific way of describing reality, which is usually built on the assumption that reality has to be understood by a thorough analysis of its smallest parts. We argue that such a scientific approach is not appropriate when it comes to the study of how digital technology participates in the shaping of peoples' lifeworlds, since each and every person's lifeworld is a result of an ongoing meaning-making process, occurring in the midst of a whole, and as such, is a fundamental relational activity.¹⁶

To any individual, *making meaning of new technology means a constant 'struggle' with a changing reality*. Technology evolves and so do our conceptions and interpretations of that evolution. The object of study becomes more a process and a relationship rather than a stable existing technology with well-defined

properties. The evolution of digital technology and its way of influencing everyday life may be described in a variety of ways. We have chosen to put forward two processes that we believe determine the character of such an ongoing evolution: the *digital transformation* and the *device transformation*.

The Digital Transformation

A central aspect of HCI research is that the underlying technology provides a basis and ground for any digital artifact and system. This technology has some specific qualities that to some extent can be captured by claiming it to be a material without properties¹⁷ and as such, a material that is extremely designable. Such a characteristic has been emphasised by other HCI researchers who regard digital technology to be extremely *reflexive* and *formative* with respect to different temporal and situational circumstances.¹⁸

This is also something that we all can experience when digital technology becomes more common and present in almost every part of our daily doings. We find ourselves using digital artifacts at work, in our homes, and when we exercise our hobbies. The technology is not only manifesting itself through individual artifacts (such as computers, software applications, PDAs, MP3 players, mobile phones, etc.) it also blends into most other artifacts. As such it is becoming embedded in all other objects, often recognised with concepts such as “everyware”, ubiquitous, pervasive, and ambient computing.¹⁹ This leads to a world that is increasingly *experienced with, through and by digital technology*.²⁰ What we are witnessing is an ongoing and radical *digital transformation*. There are of course still parts of the world not affected by this development. But there is, despite its unequal distribution, a growing presence of the technology all around the globe that makes it possible to see it as an ongoing worldwide transformation of everyday life.

One of the most important changes that come with the digital transformation is that our reality by and through digital technologies slowly becomes more *blended, networked, and intertwined*. Designed objects become parts in systems and networks where they will, or at least can, be in constant communication with all other parts, objects, and nodes. This new reality, these new systems are of course designed, but, at another level they can be seen as evolving entities, where local designs contribute to systemic changes in a larger network. The notion that every design adds a new part to our reality will have a new and much more ‘true’ meaning. New artifacts are not just adding to the already existing, *they are also becoming indistinguishable from the whole*. It becomes more difficult to distinguish where one context and/or design begins and another ends. The digital transformation, in that sense, can be seen as a step towards a manifestation of a world where everything is connected, almost in a way that is common in many spiritual understandings of our reality.

Yet another important aspect of the digital transformation appears when we start to see digital objects as a basic material in our reality. When this is the case, the reality will to some degree become “intelligent”. Designed objects will have the power to inform themselves and the network they belong to about changes in the status of their environment and actions taken upon them by humans and other objects.²¹ This also adds a new dimension to the notion of the reflexivity of information technologies already discussed.

This ‘intelligent’ or digitally infused reality also becomes a highly interactive environment in a sense that we have not seen in earlier times. When it is possible to interact with every part or object of our environment, the complexity increases and our traditional way of dealing with our lifeworld no longer give us the support we need.

To understand digital technologies and systems by analysing them individually and/or by using reductionist methods will become ever more difficult, at least if our intention is to critically examine what such an environment means for the humans inhabiting it or if we are trying to create knowledge that can be used to help people understand their changing lifeworlds.

The Device Transformation

The other of the two transformations we want to discuss is strongly related to contemporary understandings of technology with a capital T. The idea that digital artifacts constitute a vital part in human life is increasingly recognised. There are, however, several disciplines that have their own approach to technology studies, influencing the approach and conceptions of digital technologies as well. Philosophy of technology has over the last twenty years developed different approaches to question, analyse and discuss technological development and its consequences for society. These approaches often relate to the thinking of Martin Heidegger, especially his thoughts on technological understanding. Heidegger²² portrays technology as two folded, dual and dialectical. He suggests that on the one hand technology can be understood as an instrument, advancing the human attitude to the surrounding as the purposeful manipulation and control of different tools, instruments and techniques. On the other hand, and in our view even more fundamental, he also portrays technology as a form of *revealing*. In this latter sense, technology is regarded as a mode of truth and/or a sphere, in which the world is revealed *in certain ways*. This aspect of technology is, in our view, important, since it implies that technology *also* must be understood as *relating to the whole*, to the set of rules, and/or conditions in which human activity takes on specific forms and structures.

One overarching and shared concern among philosophers of technology is the rejection of technological forms of domination

referred to, for example, as reification, one-dimensionality, or *ge-stell*.²³ Such notions are particularly important since an increased presence of digital technology is considered by its critics to promote as well as increase such societal development. Heidegger, however – although indeed cryptic – warns us about exclusively understanding the neutrality and instrumentality of technology. According to him it is precisely this view that leads us to become chained to and imprisoned by technology.

[...] we shall never experience our relationship to the essence of technology so long as we merely conceive and push forward the technological [...].²⁴

Heidegger is acknowledged by many to be the first philosopher who recognised the ontological status of technology as being two-folded, dual and dialectical. First, there is the common understanding of technology as a means to an end. Second, is the aspect of technology that is related to how humans appreciate and experience being as a whole.

Technology is a mode of revealing. Technology comes to presence in the realm where revealing and unconcealment take place, where [...] truth happens.²⁵

Heidegger often used the analogies of modern and pre-modern technology in order to capture the two modes of technological understanding.²⁶ The analogy of pre-modern technology was used in order to address the suppressed and/or invisible technological understanding – in which technology cooperates with human experience in an imaginative and holistic way. In contrast, the analogy of modern technology referred to a different form of disclosure by which technology in its superiority over nature demands material and energy, otherwise impossible to detect and extract. Here these two modes are not understood as empirical or factual differences between different kinds of technological actualisations, but are interpreted as two analogies capturing two different forms of technological understanding. That is, two ways in which being can emerge by, with, and /or through technology.

The contemporary philosopher of technology, Albert Borgmann²⁷ also relies on Heidegger's dual understanding of technology in making a distinction between artifacts that are designed with respect to a larger whole or context, and those that are not – respectively *things* and *devices*. According to Borgmann, our society is rapidly being transformed into a *device society*. This means that our everyday artifacts are becoming devices instead of things (in Borgmann's language). By making this distinction Borgmann emphasizes that there are important concerns and values, i.e., ultimate concerns that are being threatened due to

the *device paradigm* characterising contemporary technological artifacts and systems.

In Borgmann's view 'ultimate concerns' are the concerns that should be catered for in technological designs, but by and large, are not. Ultimate concerns are those that provide and grant humans significance and deeper meaning in their lives. Such concerns present themselves in the form of commanding presence and receiving attention since they possess both depth and significance. They are engaging and vital because they possess many and often contradictory dimensions.

There are things around us that are designed in harmony with such ultimate concerns, things that are concrete and tangible and which contribute to deepen our experiences and sense of totality of our surroundings. Such things cannot be attained, by referring to some kind of functionality. Instead they are ascribed *focal* meaning, in that they have a tradition, structure and rhythm of their own which makes their significance and ends interweave beyond complete control. Focal things are, as such, designed with an ability to ground our lives within a larger whole where presence and continuity of body and mind is allowed.²⁸

Focal things are by Borgmann, contrasted with devices – designed in an obtrusive way to experiences of reality as a whole. Devices are made in order to take up the world in an instrumental and effective fashion. Devices have a clear distinction between machinery and function – the machinery is designed to be as intangible and invisible as possible whereas the end should be realised as instantly as possible through its various functionalities. Devices, often glamorous in their appeal, grant wishes without demanding any patience, skill or effort; also references to social and ecological contexts are reduced in the design of devices. Accordingly, by using devices people are deprived of a context in which the actualisation of ends makes sense. Devices are not designed to leave any scope for signifying processes beyond the immediate surface and can be very different from each other with respect to their functionality and their structures. But devices still share similar characteristics in that they are not designed with respect to being experienced in an active and signifying way. As Higgs & Strong frame it:

The good life that *devices* obtain disappoints our deeper aspirations. The promise of technology, pursued limitlessly, is simultaneously alluring and disengaging.²⁹

Both Heidegger and Borgmann help us to formulate the concern we have with contemporary HCI research. The message from both these philosophers is that any design of technological artifacts is a design of our actual reality and that these designs will create experiences that are being valued not only as individual objects,

but *also* as parts of a whole. Basically, they tell us that there is never a case where technological artifacts *only* can be seen as separable objects and as means. Any technological artifact *also* “points to the larger context of their setting in nature, and call for attention, effort, skill and fidelity to regular practice, and invigorate individual and community life.”³⁰

The digital transformations, as described above, lead to a situation where a great deal of contemporary design becomes design of digital artifacts and interaction technologies. As such, in one sense, the technology serving as the fundamental core within HCI research has become all encompassing. If this transformation is correctly depicted then our claim that HCI research should serve mankind is more valid then ever. The consequences of the transformation demand a deep and reflective understanding of digital technologies, and especially what this technology brings to people in the shape of promises and consequences. The ideas of Borgmann help us conceptualise some of these consequences.

The device paradigm helps us to understand why people expect so much from technology.³¹

The device paradigm tells us that most contemporary understanding of technology pushes us to move to an understanding of technology as a mere end. Technological artifacts are only understood as providers. This leaves us with an understanding of technology that is *focused* on the *outcomes* that these artifacts provide us with. Borgmann argues that this is a development that removes focal experiences from our reality, since an artifact is not only a provider, but also a placeholder that brings our experience of reality together.

Putting Heidegger’s and Borgmann’s ideas alongside the nature of the digital transformation, we conclude that two situations arise. *First*, the device transformation leads to a situation where focal experiences might be more rare since interaction design might be guided by the principles of the device paradigm. *Second*, the digital transformation puts us in a situation where our traditional ways of developing knowledge about reality will be restricted since the complexity and richness of digital artifacts partly is a result of their reflexive character. As such, they will far surpass the scope of the traditional ways used to analyse and inquire into the function, structure and behavior of technological artifacts and systems.

To researchers with the ambition of understanding the ways in which people create meaning of their realities and how new digital designs transform this process, this creates two challenges and opportunities. The first challenge, as a consequence of the device transformation, is to take an *active stance* against a development leading towards an everyday reality dominated by ‘commodities’, i.e., digital designs based on the device paradigm, and as such, a reality not designed to forward focal experiences and support a ‘good life’. The other challenge for HCI research is to take an

active part in this development, to explore and develop a more reflective understanding of this particular technology. Despite some contemporary attempts, we still believe the field is in need of methods and approaches that will bring forward a deeper understanding of people's experiences of digital interactive technologies.

A Methodological Possibility

So far, we have argued that it seems likely that digital artifacts are increasing complexity at a possible expense of significance. It is however also possible to consider the digital transformation as harboring potential opposing characteristics to the device transformation due to the reflexive character of the digital technology. By this we mean that manifestations of digital technology already exist that are indicative of designed things as *focal things*. There are, for instance, examples of digital artifacts that seem to give people deeper meaning and connection to others and to a particular context or activity. It is not uncommon to see young people exploring potentiality in digital artifacts in a way that appears to make their artifacts into focal things, instead of devices. It also seems as if it is, for some, possible to combine a number of individual artifacts, such as a cell phone, iPod, PDA, Laptop, etc., into a whole that constitutes their movable private environment. These examples show that it is extremely difficult to make clear and certain determinations of what kind of digital artifacts have the characteristics of being *devices* or *focal things*. The examination of these characteristics would be one of the core activities in the research position we are proposing.

These characteristics and potentials are however hard to locate through the means of traditional analytical and reductionist approaches to digital technology. Such methods are often very sensitive to the growth of complexity, i.e., they take more time and resources when complexity increases. What we so far have seen due to what we refer to as the digital transformation is a situation where complexity is rapidly growing. Therefore there is a need for approaches that are *insensitive* to the growth of complexity, but *sensitive* to the ways people experience their reality as a whole. We need approaches that make it possible to study how people experience a 'set-up' or private composition of digital artifacts as mentioned above, without ending up in narrow usability studies of individual functionalities or artifacts.

We will not detail develop such an approach in any detail here. However, we will briefly touch upon three aspects that taken together form a possible methodological approach. To us, the general notion of *design critique* seems to provide a process suitable for exploring the possibilities and potentiality inherent in the experiential realm with respect to peoples' relationship with information technologies. When doing design critique people engage in immediate aesthetic appreciations, which lead to our second aspect, the notion of *aesthetic experience*. The third aspect

is the *critical aspect* focused on the questioning of purpose and overall contribution of the technology to people's lifeworlds. Taken together, these three aspects, even though sounding abstract and philosophical, constitute an approach that is practical and includes simple activities that most designers already recognise and that can be transformed into research activities. These activities are commonly seen as 'practical' steps in a design process but not necessarily as a possible research process. We would argue that if understood clearly and developed into a disciplined process these activities could serve research purposes as a methodological approach suited for the research position we advocate.

Design Critique

Design critique as a way of evaluating designs has a long tradition in architecture, visual design, graphic design, product design and others. Unfortunately, design critique has not been conceptually well developed, in the HCI field. This brief portrait is not to be read as a definition, but more as a first framing of the basic qualities of such an activity. A design critique can, in its most simple form, be compared with the process of evaluating literature. It is not possible to evaluate a book by measuring specific qualities, such as number of words or pages. Even though each measure increases our understanding of the book, the questions of whether this is a book worth reading and does it give us a deeper appreciation of our lives are not answered by such measurements. Instead, the overall appreciation of the book comes from reading it, taking into consideration all possible qualities at once, forming these into an overall judgment, and doing so in relation to expectations and purpose of the experience. This kind of heightened sensibility for quality is both trained and executed in a design critique session.

The basic idea of a design critique is to have a session of accomplished, or to be accomplished, designers examining a particular design. A design critique is always about a *particular* design. The critique may cover any aspect, such as form, function, appearance, structure, performance, usage, etc. of the particular design. There is usually no preconceived protocol for a critique, even though there are proposals for how to set up and facilitate a critique.³² Rather, the critique spans the design from the smallest details to the whole. The idea is to examine the qualities that stand out as especially important, whatever they might be. It is not an objective exercise, instead it is highly subjective where each critic makes their comments based on their own experiences and judgments. The basic idea with the design critique is, in a very short time, to establish an understanding of the *overall qualities* of the design. It is a process that relies on immediate experience, often on an aesthetic understanding, but also a process that can make use of secondary sources, especially compiling the insights that

emerge from secondary readings of empirical studies into complex and nuanced wholes. The design critique invites contrast and comparison between particular designs and historically significant exemplars. In doing so, the process provides a mechanism for nuanced discourse and understanding of particular designs, without leading to reductive discourse and understandings. Instead, it provides a mechanism for comparisons that are massively multi-dimensional and cross-contextual, including aspects of fashion, form, color, appearance, semantics, symbolisms, and other dimensions.

The basic core of a design critique is that it is focused on the experienced whole of a design. The way to approach an understanding of the whole and its qualities is not pre-conceived or structured, and neither is the way people experience their everyday lifeworld. Designers themselves have a special role on this process since, over time, they develop a sensibility about the qualities of specific types of artifacts. Such a sensibility takes years of training and of being exposed to huge numbers of designs of varying quality and type.

We believe that the process of a design critique is one example, probably out of many, of how our proposed research position could be implemented and manifested in real educational and professional settings.

Over the last few years, HCI researchers have made some attempts to provide new theoretical frameworks and methods for how to study and explore the variety of meanings and behaviors evoked by digital artifacts.³³ These attempts have led both to a critical questioning of core metaphors in design and to various attempts to invert such metaphors in order to bring what has been marginalised to the center of attention in design. We find these approaches valuable and believe they can be incorporated in the more practical activity of design critique as intellectual tools that can help develop a sensibility of quality.

Aesthetic Experience

Some attempts have been made towards considering the importance of aesthetics in HCI.³⁴ Besides turning attention to conventional usability characteristics, the interest in aesthetics in HCI has also been used in similar ways as we are advancing with the notion of design.³⁵

Rendering people's experience with technology as transformative, imaginative, and creatively meaningful is the proper corrective against pervasive disenchantment tales.³⁶

Accordingly, the base for an active and critical stance needed to resist the development of digital technologies based on the device paradigm, can, in our view, be accomplished by grounding HCI

research in a critical research tradition, paying particular attention to aesthetic experience of digital technology. As such, design critiques are guided to actively resist a view of digital technologies with strong connotations to *the device transformation*.

The notion of aesthetics in general and aesthetic experiences in particular defines an approach that is neither analytical nor reductionist. Rather it is an approach that takes the *whole* and the *immediate* into account. We see this approach to be deeply *designerly* while at the same time being *critical*. The notion of design critique as a means of evaluating existing and proposed designs implies a highly critical exercise that manifests the same goals of focusing on the whole and the immediate experience.³⁷ The approach of aesthetic experience is based on John Dewey's view that meaning and significance can be regarded as a transaction rather than as a subjective projection:

The expressiveness of the object is the report and celebration of the complete fusion of what we undergo and what our activity of attentive perception brings into what we receive by means of the sense.³⁸

Dewey seems to account for something left out of most contemporary accounts of meaning, namely, the way something genuinely new can arise in experience. In similar ways, both Ramirez and Nye contend that through aesthetics we can generate substantial knowledge of the *immediacy* of experience.³⁹

Aesthetics consists of a symbolization process in which, what is symbolized as beauty or expressive form is '*felt life*'. It's an expressive form that has an organic character.⁴⁰

Beauty or aesthetic experiences are however often conceived of as a *restful* state of the mind. Although this might appear to be in conflict with characterising such experiences as vitalizing, enlivening or enhancing as already discussed above, a restful state of mind should not be confused with being inactive.

The life of the mind as a whole can be described as restful even though particular faculties are active. Rest in this sense does not entail passivity, but a state of equilibrium in which particular activities are balanced.⁴¹

This interpretation of aesthetic experience qualifies the concept in a way that can be used in further studies of situations, experiences and contexts where people's total lifeworld changes due to certain uses of information technologies. Aesthetic experiences are related to a sense of *equilibrium* of mental life of the subject, in a way that accounts for *the potential of something being meaningfully*

present or at least could be further explored as such. Ramirez and other theorists of aesthetics hold this potential to be fundamental, emphasising the importance of the direct feeling of furtherance and enhancement. In this respect, McCarthy and Wright warn us about anticipating a finite and comprehensive unity, they write:

We tend to close our mind to the potentiality [...] having already decided what everything is.⁴²

By this potential it is suggested that technology has the ability to 'speak back' through the material constraints and opportunities signifying particular experiences. Our concern so far is that nobody cares or has taken responsibility to pay attention. This further suggests that research and researchers seeking an aesthetic comprehension of information technology must find alternative ways and inducements for their work.

This does not mean the revival of values, spiritual or other, which are to supplement the scientific or technological transformation [...] On the contrary, the historical achievement of science and technology has rendered possible the translation of values into technical tasks – the materialization of values.⁴³

The particular focus on aesthetic experience is hence here used as one possible way to identify some pervasive qualities and at the same time maintain a view of the digital transformation as having a potential to give people deeper meaning and connection to others and to a context. If so, a focus on aesthetic experiences might lead HCI researchers to acknowledge and find ways to further explore the variety of strategies and tactics that are being employed in using and designing digital interactive technologies.

Although not thoroughly elaborated here, our suggestion is that aesthetic experience is one of the concepts that can be used to frame an understanding of digital interactive technologies as having the potential of constituting an expressive form with organic character strongly related to peoples' lifeworlds, or "focal things" in Borgmann's words.

Aesthetic experiences might, however, be about many different aspects of reality, at the same time as they are able to be captured and interpreted through design critiques. This very different view sets aside traditional inside-outside distinctions such as those between subject and object and between different subjects and different objects. People and their worlds, as well as their aesthetic experiences, are immediate and emergent 'products' of relational processes in which digital artifacts increasingly play an important part.

A Critical Approach

The focus on aesthetic experience is, however, only one way to reveal people's lifeworld through the examination of their relation to technology. It is also a radical approach opening up for change within HCI research. The critical stance expressed here is basically a *creative* approach. It is an approach aiming for the inherent *potentiality* of digital technology.⁴⁴ It is a way to undermine the basis of a non-reflective affirmation of today's technology and to break the conformity of thoughts on the nature and character of present uses of digital technology. The search for potentiality can be hindered with a too strong emphasis on existing empirical findings. According to the critical tradition, empirical facts have to be approached from a theoretically strong position. We believe this approach, with a focus on the aesthetic experience, to be one way to find and explore creative abstractions, i.e., theoretical constructs that reveal reality in new ways. As Marcuse writes:

Such abstraction which refuses to accept the given universe of facts as the final context of validation, such 'transcending' analysis of the facts in the light of their arrested and denied possibilities, pertains to the very structure of social theory.⁴⁵

We believe that a research position such as the one we have proposed, and its methodological suggestion, makes it possible to conduct research that will be found to be creative and novel. It is a position that takes on the challenge of being an intellectual 'opponent' to the contemporary conformity in the way researchers make meaning out of the new technology. Our message is basically optimistic since we believe there is a huge and almost infinite potentiality 'hidden' in digital technology. It has a potentiality, if explored, that we can use to design our environments in such a way that they will be suitable for the 'good life'. But, as long as research in our field is not taking this as a serious challenge, the outcomes will continue to be ever more efficient support of the ongoing device transformation leading us to a place where we might not want to go.

Towards a Research Position

Our intention has been to formulate a research position that focuses on what constitutes the experiences of digital artifacts that an individual sees as contributing to a 'good life'. Such experiences are of course infinite and complex. They are also analog to their character, in that the world is experienced as one. In the creation of such experiences, digital interactive technologies are not separated from anything else. Experiences of technological artifacts are seamlessly interwoven in a complex web of meaning.

One of our assumptions has been that there is a need for a critical stance, a research approach that advances the idea that

technology can be critically examined in the search for the ‘good life’. Taken together, our assumptions and our purpose have ‘forced’ us to formulate a research position that could serve as the foundation for such a critical project.

We have defined such a research position as being manifested by the notions of *methodology*, *object of study*, and *service*. Without neglecting other positions, we have proposed one position as especially needed today when digital and device transformations are rapidly changing the preconditions for our possibilities to live a good life.

We have discussed two transformations, the digital and the device transformation, as arguments for the need for a new methodological awareness in HCI research. We have suggested that the notion of aesthetic experience is one possible way to go and could create a foundation for further methodological development, some of which we have briefly touched upon in this paper.

We believe that HCI research is better suited than most other academic disciplines to take on this difficult and grand challenge. It is already very much in line with existing research traditions of HCI. It is also the case that HCI research is one of the few fields that have the necessary double competence both in the technological development as well as in the advancements within social, psychological, and cognitive theory.

Finally, there is the question of *being in service*. Our work has been guided by a sincere desire to take on the ‘big issue’. It is, of course, a too grand project for a single researcher or research group. It might even be an impossible task driven by an ambition not in line with what is possible or manageable. At the same time, as researchers we cannot shy away from important issues because we believe they are not ‘researchable’. We have the responsibility to be in service of the society and the people who ask us for knowledge and advice. The overall issue about how digital artifacts, on a fundamental level, influence our lives is maybe the most crucial issue today. This paper has attempted to focus on that issue and to build a research position that might be used as a starting point in such studies.

Notes

1. Verbeek, P-P. (2005) *What Things Do: Philosophical Reflections on Technology, Agency and Design*. University Park: Pennsylvania University Press; Borgmann, A. (1999) *Holding on to Reality: The Nature of Information at the Turn of the Millenium*. Chicago: The University of Chigcago Press.
2. Higgs, E., & Strong, D. (2000) Borgmann’s Philosophy of Technology. In E. Higgs, A. Light & D. Strong (Eds). *Technology and the Good Life?* Chicago: The University of Chicago Press;

- McCullough, M. (2004) *Digital Ground: Architecture, Pervasive Computing and Environmental Knowing*. Cambridge: MIT Press; Nye, D. (2006) *Technology Matters: Questions to live with*. Cambridge: MIT Press.
3. Oudshoorn, N. and Pinch, T. (2003) Introduction, in Oudshoorn, N. & Pinch, T., (Eds.) *How Users Matters: The Co-construction of Users and Technology*. Cambridge: MIT Press; Selwyn, N. (2003) Apart from technology: Understanding people's non-use of information and communication technologies in everyday life. *Technology and Society*, vol. 25. pp. 99–116. Wyatt, S. (2005) Non-Users Also Matter: The Construction of Users and Non-Users of the Internet, in Oudshoorn, N. & Pinch, T., (Eds.) *How Users Matters: the Co-construction of Users and Technology*. Cambridge: MIT Press.
 4. Borgmann, 1999.
 5. Marcuse, H. (1964) *One Dimensional Man: Studies in the Ideology of Advanced Industrial Society*. Boston: Beacon Press.
 6. Weick, K., (1989) Theory Construction as Disciplined Imagination, *Academy of Management Review*, 14:4 516–531.
 7. Caroll, J. (2001) *Human-computer interaction in the new millennium*. New York: ACM Press/Addison-Wesley Publishing Co; Dourish, P. (2006) Implications for Design, *Proc. ACM Conf. Human Factors in Computing Systems CHI 2006* (Montreal, Canada), 541–550; Rogers, Y. (2004) New Theoretical Approaches for Human-Computer Interaction, *Annual Review of Information, Science and Technology*, vol. 38, pp. 87–143; Löwgren, J. & Stolterman, E. (2004) *Thoughtful Interaction Design: A Design Perspective on Information Technology*. Cambridge, Mass: MIT Press; Kaptelinin, V. & Nardi, B. (2006) *Acting with Technology: Activity Theory and Interaction Design*. Cambridge: MIT Press.
 8. Caroll 2003, Kaptelinin and Nardi 2006, McCarthy, J., Wright, P. (2004) *Technology as Experience*. Cambridge: MIT Press.
 9. Dourish 2001, Löwgren and Stolterman 2004, Verbeek 2005, Krippendorff, K. (2006) *The Semantic Turn – A New Foundation for Design*. CRC Press.
 10. Nelson, H. & Stolterman, E. (2003) *The Design Way—Intentional Change in an Unpredictable World*. Englewood Cliffs, N.J. Educational Technology Publishing.
 11. Marcuse, 1964.
 12. Feenberg, A. (1999) *Questioning Technology*. London: Routledge; Latour, B. (1993) *We have never been modern*. Cambridge: Harvard University Press; Levy, P. (1997) *Collective Intelligence: Mankind's emerging world in cyberspace*. New York: Plenum Trade; Nardi, B.A. & O'Day, V.L. (1999)

- Information Technologies. Using Technology with Heart. Cambridge: MIT-Press.
13. Verbeek 2005
 14. Dewey, J. (1934) *Art as Experience*. New York: Perigee Books; Pillow, K. (2000) *Sublime Understanding: Aesthetic Reflection in Kant and Hegel*. Cambridge, MA: The MIT Press.
 15. Moran, D. (2000) *Introduction to Phenomenology*. London: Routledge; Sokolowski, R. (2000) *Introduction to Phenomenology*. New York: Cambridge University Press.
 16. McCarthy and Wright 2004.
 17. Löwgren, J. & Stolterman, E. (1999) Developing IT design ability through repertoires and contextual product semantics, in *Digital Creativity*, Vol. 9, No 4.
 18. (McCarthy & Wright 2004; Croon Fors, A. (2006) *Being-with Information Technology: Critical explorations beyond use and design*. Umeå University: Department of Informatics; Sengers, P., Boehner, K., David, S. & Kaye, J. (2005) Reflective Design, in Bertlesen, O. & Kyng, M. (Eds.) *Between Sense and Sensibility*, Proc. of the forth decennial Aarhus Conference, University of Aarhus, Denmark.
 19. Greenfield, A. (2006). *Everyware—The Dawning Age of Ubiquitous Computing*. Peachpit Press; Dourish 2001.
 20. Borgmann, 1999.
 21. Kelly, K. (1994) Out of Control. The New Biology of Machines, Social Systems, and the Economic World. Reading, MA: Perseus Books; Greenfield 2006; Norman, D. A. (2007). *The Design of Future Things*. New York: Basic Books.
 22. Heidegger, M. (1977) *The Question concerning Technology and other Essays*, New York: Harper & Row.
 23. Marcuse 1964; Heidegger 1977.
 24. Heidegger, 1977 p. 4.
 25. Heidegger, 1977 p. 13.
 26. Croon Fors 2006.
 27. Albert Borgmann (1999) and Borgmann, A. (1984) *Technology and the Character of Contemporary Life: A Philosophical Inquiry*. Chicago: The University of Chicago Press.
 28. Borgmann 1984, p. 122, 176f.
 29. Strong & Higgs, 2000, p. 23 our emphasis
 30. Strong & Higgs, 2000, p. 32.
 31. Strong & Higgs, 2000, p. 27.
 32. Berkun, S. (2003). How to run a design critique. <http://www.scottberkun.com/essays/essay23.htm>
 33. Agre, P. (1997) *Computation and Experience*. Cambridge, Mass: MIT Press.
Dourish 2001, Dreyfus 2001, Kaptelinin and Nardi 2006.
 34. e.g., Hassenzahl, M. (2004) The Interplay of Beauty, Goodness, and Usability in Interactive Products. *Human-Computer Interaction*, vol. 9, pp. 319–349.

- McCarthy and Wright 2004, Norman, D (2004) *Emotional Design: Why we Love (or Hate) Everyday Things*. New York: Basic Books.; Redström, J. (2001) *Designing Everyday Computational Things*. Göteborg University, Sweden: Department of Informatics; Sengers, P. & Gaver, B. (2006) Staying Open to Interpretation. Engaging Multiple Meanings in Design and Evaluation. *Proceedings of the 6th ACM conference on Designing Interactive systems*. University Park, Pennsylvania: ACM; Sengers et al. 2005; Tractinsky, N. & Hassenzahl, M. (2005) Arguing for Aesthetics in Human-Computer Interaction. *I-com* vol. 4, no. 3, pp. 66–68.
35. McCarthy and Wright 2004.
 36. McCarthy, J. & Wright, P. (2003) The Enchantments of technology, in Blythe, M et al., (eds.) *Funology. From Usability to Enjoyment*. Dordrecht, the Netherlands: Klüwer, 2003, p. 82.
 37. Dourish, P., Finlay, J., Sengers, P., & Wright, P. (2004) Towards a critical technical practice. In *CHI'04 Extended Abstract*. NY: ACM Press, 1727–1728; Verbeek 2005.
 38. Dewey, 1934, p. 103.
 39. Ramirez, R. (1991) *The Beauty of Social Organization*. Munich: Accedo; Nye, D. (1994) *American Technological Sublime*. Cambridge: MIT-Press.
 40. Ramirez 1991, p. 66, our emphasis.
 41. Makkreel, R. (1990) *Imagination and Interpretation in Kant: The Hermeneutical Import of the Critique of Judgment*. Chicago: The University of Chicago Press.
 42. McCarthy and Wright (2004), p. 70.
 43. Marcuse 1964, p. 231f.
 44. Marcuse, 1964.
 45. Marcuse 1964.

Bibliography

- Agre, P. (1997). *Computation and Experience*. Cambridge, Mass: MIT Press.
- Berkun, S. (2003). How to run a design critique <http://www.scottberkun.com/essays/essay23.htm>
- Borgmann, A. (1984). *Technology and the Character of Contemporary Life: A Philosophical Inquiry*. Chicago: The University of Chicago Press.
- Caroll, J. (2003). HCI Models, Theories and Frameworks: Toward a Multi-disciplinary Science. San Francisco: Morgan Kauffman.
- Croon Fors, A. (2006). *Being-with Information Technology: Critical explorations beyond use and design*. Umeå University: Department of Informatics.
- Dewey, J. (1934). *Art as Experience*. New York: Perigee Books.

- Dourish, P., Finlay, J., Sengers, P., & Wright, P. (2004). Towards a critical technical practice. In *CHI'04 Extended Abstract*. NY: ACM Press, 1727–1728.
- Feenberg, A. (1999). *Questioning Technology*. London: Routledge.
- Greenfield, A. (2006). *Everyware—The Dawning Age of Ubiquitous Computing*. Peachpit Press.
- Hassenzahl, M. (2004). The Interplay of Beauty, Goodness, and Usability in Interactive Products. *Human-Computer Interaction*, vol. 9, pp. 319–349.
- Heidegger, M. (1977). *The Question concerning Technology and other Essays*, New York: Harper & Row.
- Higgs, E., & Strong, D. (2000). Borgmann's Philosophy of Technology. In E. Higgs, A. Light & D. Strong (Eds). *Technology and the Good Life?* Chicago: The University of Chicago Press.
- Kelly, K. (1994). *Out of Control. The New Biology of Machines, Social Systems, and the Economic World*. Reading, MA: Perseus Books.
- Krippendorff, K. (2006). *The Semantic Turn – A New Foundation for Design*. CRC Press.
- Latour, B. (1993). *We have never been modern*. Cambridge: Harvard University Press.
- Levy, P. (1997). *Collective Intelligence: Mankind's emerging world in cyberspace*. New York: Plenum Trade.
- Löwgren, J. & Stolterman, E. (1999). Developing IT design ability through repertoires and contextual product semantics, in *Digital Creativity*, Vol. 9, No 4.
- Makkreel, R. (1990). *Imagination and Interpretation in Kant: The Hermeneutical Import of the Critique of Judgment*. Chicago: The University of Chicago Press.
- McCarthy, J. & Wright, P. (2003). The Enchantments of technology, in Blythe, M et al., (eds.) *Funology. From Usability to Enjoyment*. Dordrecht, the Netherlands: Klüwer.
- Moran, D. (2000). *Introduction to Phenomenology*. London: Routledge.
- Nardi, B. A. & O'Day, V. L. (1999). *Information Technologies. Using Technology with Heart*. Cambridge: MIT-Press.
- Nelson, H. & Stolterman, E. (2003). *The Design Way – Intentional Change in an Unpredictable World*. Englewood Cliffs, N.J. Educational Technology Publishing.
- Norman, D (2004). *Emotional Design: Why we Love (or Hate) Everyday Things*. New York: Basic Books.
- Norman, D. A. (2007). *The Design of Future Things*. New York: Basic Books.
- Nye, D. (1994). *American Technological Sublime*. Cambridge: MIT-Press.
- Pillow, K. (2000). *Sublime Understanding: Aesthetic Reflection in Kant and Hegel*. Cambridge, MA: The MIT Press.

- Ramirez, R. (1991). *The Beauty of Social Organization*. Munich: Accedo.
- Redström, J. (2001). *Designing Everyday Computational Things*. Göteborg University, Sweden: Department of Informatics.
- Sengers, P. & Gaver, B. (2006). Staying Open to Interpretation. Engaging Multiple Meanings in Design and Evaluation. *Proceedings of the 6th ACM conference on Designing Interactive systems*. University Park, Pennsylvania: ACM.
- Sengers, P., Boehner, K., David, S. & Kaye, J. (2005). Reflective Design, in Bertlesen, O. & Kyng, M. (Eds.) *Between Sense and Sensibility*, Proc. of the forth decennial Aarhus Conference, University of Aarhus, Denmark.
- Shedroff, N. (2001). *Experience Design*. Indianapolis: New Riders.
- Sokolowski, R. (2000). *Introduction to Phenomenology*. New York: Cambridge University Press.
- Strong, D. & Higgs, E. (2000). Borgmann's Philosophy of Technology In Higgs, E., Light, A. & Strong, D. (Eds.) *Technology and the Good Life?* Chicago: The University of Chicago Press.
- Tractinsky, N & Hassenzahl, M. (2005). Arguing for Aesthetics in Human-Computer Interaction. *I-com* vol. 4, no. 3, pp. 66–68.
- Tractinsky, N., Shoval-Katz, A. & Ikar, D. (2000). What is beautiful is usable. *Interacting with Computers*, vol. 3, no. 2, pp. 125–145.
- Tractinsky, N. (1997). Aesthetics and apparent usability: empirically assessing cultural and methodological issues, *Proceedings of CHI'97*, pp. 115–122. New York: ACM Press.
46. Verbeek, P-P. (2005). *What Things Do: Philosophical Reflections on Technology, Agency and Design*. University Park: Pennsylvania University Press.