The embodiment of a format in interaction design

A discussion about design thinking, acting and tools for intentional creation of emergent qualities

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Abstract

Design researchers and design practitioners differ regarding their notion of the nature of design complexity, and how design practitioners should approach it in a rational way. By describing three ways of viewing design rationality, different approaches of what it means to design and be a designer is presented. This paper argues that design complexity is ‘wicked’, with no definite conditions or limits to design problems. This means that the designer acts as a ‘bricoleur’; someone who shares the notion of ‘wicked’ design complexity, and who understands that the components in the design space is interrelated and interdependent. A ‘bricoleur’, engages in the design space with systems thinking, in a dialectic process of interpretation and meaning-making, where judgment and imagination are the core design skills. I describe this process in terms of the design of a composition, guided by a parti (an early vision of the design) with the aim to create a strong format (a gestalt) with desired emergent qualities. In this process I have pinpointed the ‘embodiment of a format’ as the key activity if the designer wishes to create a design with components in harmony and desired emergent qualities. When the designer embodies a format, the designer becomes aware of the different roles that components in a design have in the whole design, and as a consequence, this creates awareness of the qualities that emerges before the design is implemented. This paper also discusses the support for this activity in the tools used by interaction design practitioners, and that sketching is the tool that is mostly used in the activity of ‘format embodiment’. The conclusion is that there is a lack of support for ‘format embodiment’ in the tools that are promoted by mainstream HCI-research. Design researchers should view the designer as a ‘bricoleur’ to be able to address the need for tools for format embodiment.

1. Introduction

Previously concerned mainly with aesthetics and functionality, the scope of design has widened to encompass intentional change that affects society and culture by the creation of new services, products, environments and systems. Interaction design is one of these design disciplines where the material turn within the field of HCI is apparent in the broad range of configurations, fusions and blends of physical and virtual materials. Researchers have claimed that this converging of materials render an approach to digital materials with multiple interpretations to fully encompass the complexity, dynamics and interplay of user, system and designer interpretation (Sengers and Gaver 2006). As design action addresses more complex issues, its expanding scope appears to render systems thinking, as a means for the designer to be able to intentionally compose a design with desired emergent qualities.

Indeed, interaction design practitioners also have this notion that the creation of the not-yet existing is about creatively and critically composing relationships into a coherent whole (Nelson and Stolterman, 2003). However, the importance of systems thinking in design
action is not the underlying foundation of mainstream interaction design research (Rogers, 2004; Cross 2001).

Researchers approach design complexity as something inherently bad, prescribing tools for interaction designers that reduce complexity by isolating components to calculate a "solution to a problem" (Buchanan, 1992). This problem-solving approach has led to a fundamental mismatch between how the design process is carried out by design practitioners, compared to how design researchers think it is, or should be, conducted (Rogers, 2004; Cross, 2001). Also, the design process itself has been under attack, and claimed to be either a “black-box” motivated by intuition (Fällman, 2003; Coyne and Snodgrass, 1995) or a scientific endeavor for the search of a “true” design (Boehner et al. 2007; Stolterman, 2008). Both of these approaches have led to the conclusion that more rigorous scientific tools are needed in the design process.

Designers act in an intentional and rational way, but this rationality is different from the design researcher’s notion of design rationality as the quest of finding a universal true design. To design is to support meaning-making and situated actions in specific contexts (Stolterman, 1994; Fällman, 2003; Krippendorff, 1989). Furthermore, the scientific problem-solving approach takes away the designers responsibility, making him or her, an ‘operator’ of a method; if the designer follows the method precisely, the design is believed to come into existence “by itself”. In the real design situation, the designer uses imagination and judgment to compose a particular design, seeing complexity as a source of inspiration, not something bad that needs to be reduced.

In this paper, I explore the place of composition as an implementation of systems thinking in design action. I do this by using the terms parti and format, parti being the early vision of a design, and format being the emerging gestalt of a particular design when it is actually implemented (Stolterman, 1999). The activity of transforming a parti to a format is when the designer needs to use the skills of imagination and judgment, in order to compose a design that is true to the parti, but that also exhibits harmony among the components so that the format of the artifact becomes strong, with desirable emergent qualities.

By describing the act of composition, I hope to also illuminate how successful design action presupposes an approach to complexity with systems thinking, recognizing the interdependence between components and their effect on emergent qualities.

As described above, the format is the emergent gestalt of an artifact that has been implemented (i.e. an artifact that is constructed and ready to be used). The format is influenced by all the components that it consists of, but the format is also something more than the sum of its parts.

A Ferrari consists of numerous parts that are high performing (e.g. engine, breaks, tires) as well as parts that are beautiful to look at, (e.g. the wheels, the different parts of the body), however, when we are confronted with a real Ferrari, the car becomes something more than just high quality and beautiful parts put together. It becomes a design that people becomes amazed by; a car to love and to dream about. If we think about it, this is true for every designed thing around us; they become more than the bits and pieces that they consists of. Sometimes the format can seem ugly or wrong to us, and sometimes we cannot quite make
up what the format is; yet other times the format can make perfect sense, and bring us joy and meaning as in the case of a Ferrari.

If we agree upon the existence of emergent qualities, it seems vital that the designer have means to design these emergent qualities in a desired way. In this paper, the main focus is therefore to explore what is required in forms of thinking, acting, and use of tools to be able to intentionally design a format; to be able to design and compose the components in such a way so that desired qualities emerges. I have chosen to call this activity format embodiment (or the embodiment of a format).

This will lead me to also study tools to support this activity (the term “tools” also encompass methods techniques and approaches, which designers often refer to as “tools” (Stolterman et al., 2008). These tools have different qualities than the prescriptive and reducing tools inspired by the scientific problem-solving approach. This paper shows that tools should allow the designer to see complexity in different ways, and allow the designers to engage in a dialectic process of meaning making. It is found that designers from different design disciplines use sketching for this purpose. When using sketching, designers are confronted with complexity in new ways and to use sketching is to engage in a dialectic composition process with the materials in the design space.

Interaction design involves factors like interactivity, temporality, tangibility, immersion sound, haptics etc. (Fällman, 2003). This creates unique design challenges for interaction designers. Because of design researcher's lack of understanding of the design practitioners design process, the tools used are to a great extent borrowed from other design areas (e.g. sketching, scenarios, cultural probes), where an understanding of the importance of format embodiment is present. I propose that there is a need for tools with the same qualities as sketching, but that also encompass the aforementioned factors that are commonly dealt with in interaction design. These tools should enable the design of interactivity, temporality, tangibility, immersion sound, haptics etc. in the same complexity-embracing and reflective way as sketching does. I claim that this is needed in order to intentionally design a format with desirable emergent qualities.

2. Design complexity

2.1 Strategies to handle complexity based on the nature of science

One of the primary goals of design science has been to make the seemingly chaotic design process more “logical” (Coyne and Snodgrass, 1995). Inspired by the scientific method, the aim is to find a rational, organized and systematic approach to design (Cross, 2001). The proponents of design science see the design process as linear, with two distinct phases; problem definition and problem solving (Buchanan, 1992). Problem definition is where the designers analytical skills are used to determine all the elements of a problem, and to specify all of the requirements that that a successful design must satisfy. Problem solution is a synthetic activity where different requirements are taken together and balanced against each other to form a final plan to be carried out to production. The beauty of such a methodology is that design is viewed as a scientific activity that can be carried out objectively and
independently of the designer’s perspective. The designer becomes the ‘operator’ of a methodology, where the choice and compliance of set methodology decides if the design becomes successful or not.

In a literature study investigating the use of cultural probes in HCI, Boehner et al., (2007) found that the researchers viewed uncertainty in the results of cultural probes as a problem. The studies showed that there was a tendency of trying to narrow down the possible meanings to produce the one and only interpretation from the probe responses, rather than recognizing that many interpretations are conceivable: “such studies thus introduce analytical rigor into their interpretive methods by including follow-up interviews, statistical methods such as graphing or numerical analysis, or cross validation of results” (Boehner et al., 2007, p. 5). This is one example of the design scientist’s tendency to narrow down and reduce design complexity.

2.1 Strategies to handle complexity based on the nature of design

Critics to design science claim that the design process is not something that is possible to make linear or logical in the same way as the scientific process: "design methods as codified plans selected and rigidly applied to accomplish some objective, have very limited usefulness now" (Coyne and Snodgrass, 1995, p. 37). One reason for this is something that has been referred to as wicked problems. Churchman (1967) describes wicked problems as:

“a class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing”.

Wicked problems are not a special sort of problems, but rather the kind of problems that designers have to deal with all the time. These problems are fundamentally different from the sort of problems that design scientists believe that the designers handle. The idea that there is a linear solution to design problems is grounded in the notion that there is a determinate problem, which has definite conditions, where the designer’s task is to identify those conditions and calculate a solution. The wicked-problems approach proposes a fundamental indeterminacy in design problems and that there are no definite conditions or limits to design problems (Buchanan, 1992).

The reason why design problems are indeterminate and wicked is, according to Buchanan (1992), due to the subject matter of design. Design has the potential of being universal in scope, the only limit being what the designer conceives it to be. Design can be applied to any area of human activity. This is also something recognized by Nelson and Stolterman (2003 p. 30): “No matter how much we want to satisfy all possible truths, in a design situation, we will find that some of them are contradictory, unclear or not yet fully revealed”.

According to Stolterman (2008), dealing with design complexity involves opposite goals than the scientific approach. Instead of finding a universal truth, it is about the creation of the particular. A particular for a specific purpose, with specific functionality and characteristics, that fit a specific situation, client and user. Furthermore, this is to be
achieved in a situation where time and resources are limited as opposed to the ongoing search for truth by researchers. Nelson and Stolterman (2003 p.33) points out that there is no point in relying on scientific methods in the creation of the not-yet-existing:

“There is no scientific approach to determining the particular because science is a process of discerning abstractions that apply across categories or taxonomies of phenomena, while the particular is singular and unique”.

Therefore, a scientific approach, which has the aim of finding the universal truth, cannot be used to create the particular design.

3 Design formation

3.1 Design rationality

When the design process is viewed as being scientific, the process looks irrational and chaotic, seemingly without any rationality. This is an assumption that is based on a view that there is only one way to be rational, and this is by acting as the ‘economic man’ (Stolterman, 1994). This is a view on the designer that is based on the assumption that the designer works under stable conditions to find solutions by searching and calculating, and not by inventing and creating something new. One major motivation for methodologies is therefore to transfer the ideals of the ‘economic man’ to the design process by prescribing step-by-step methodologies according to the scientific problem-solving approach.

To view design rationality on the other extreme, is to see the design process as a ‘black-box’ and the designer as a ‘creative genius’ (Fällman, 2003). As opposed to ‘the economic man’ this view on the designer recognizes the role of the designer as being something different than an operator of a method. Quite the opposite, the designer should be very cautious with methods, which can infer with the almost ‘magical’ creative design process: “like golfers, designers might come to lose their swing if they think too much about what they actually do when they design” (Fällman, 2003, p. 3).

Where the ‘economic man’ has the scientist as a role model, the idea of the ‘creative genius’ is closely related to that of painters, musicians, poets, artists and composers. The process is driven by values and taste, and the product is judged according to the designer’s notion of quality and aesthetics.

The third view on design rationality is the pragmatic account, which recognizes the ‘situatedness’ of the design process (Fällman, 2003). A design process is always carried out somewhere in particular; in a world already filled with people, artifacts and practices, each with their own goals, identities, histories and plans. To deal with this, the designer engages in a hermeneutic process of interpretation and meaning-making, where “designers iteratively interpret the effects of their designs on the situation at hand” (Fällman, 2003, p. 3).

It is an act of reflective conversation with the materials of the design situation, a skill of taking on multiple views and possessing a compound eye. The pragmatic account is to view the designer as a “bricoleur”, using the tools and materials offered by the current situation,
treating them abstractly to define the roles that they have in a given situation by entering a dialogue with them.

This is something that Harrison et al. (2006) describes as the situated perspectives paradigm. When viewing design in this way, the goal is to support meaning-making and situated actions in specific contexts. This perspective emphasis multiple perspectives and as such, it obsoletes ‘correct’ sets of methods and approaches but it also recognizes the importance of reflecting on the design situation and the designers own actions, as opposed to the view on the designer as an ‘creative genius’.

Stolterman (1994) agrees with this view, claiming that the rationality of the designer is situated, and that it emerges in the specific design context. This dialectic approach to design is based on the idea that the world is changing constantly, and that we cannot understand it unless we understand what change is and why it takes place (Dahlbom and Mathiassen, 1993). Design practitioners view themselves as craftsman rather than as an ‘economic man’ or a ‘creative genius’.

3.2 Parti and format

Parti is described by Ryan et al. (2009) as the forming of the designer’s first idea of a design after the design exploration. It is an “early, strong, organizing principle guiding the designer in the following design process” (Stolterman, 1999). The parti guides the designer to compose the design into an integral whole, and is to its nature provisional, general and vague. This is a good thing because it allows the designer to deviate from the parti, to change it when new circumstances occur. Arnheim (1993) describes the parti as a topological shape that stands for a whole range of possibilities without being explicitly committed to any of them.

The format is how the parti expresses itself in the world and is the overall organization of the system. An example of a format could be that all functions of an artifact are focused on reliance or that the symbols used in the design of a new web page are consistent with the ones used on the current one. “Every detail of the system will contribute to the overall format. The structure, the function and the form must be in relation to the context and the purpose” (Stolterman, 1999, my emphasis).

When the different components are composed together they make up the format of the system, a whole with emergent qualities. Important to notice is that the format is not the guiding principle for the design, but rather the implementation of them. The format can be compared with the notion of gestalt as described by Capra; a whole that possesses qualities that are not present in the parts, it is thus more than the sum of its parts (Stolterman, 1999).

The format can also be described as a style or a fashion, where the design principles are present in all parts of a system or design, for example Scandinavian furniture design is famous for having an apparent and consistent style; it has a strong format. If the format is implemented well, and, if the format is strong, the users might get a sense of unity, with an overall understanding of the system where every part fits together. When a format is not there, the users might find the system impossible to understand and that the relation between form and function are ugly and bad.

Stolterman (1999) describes the kind of thinking that consider the importance of a strong format as architectonic thinking. This is different to tectonic thinking, which is a way of
thinking that lacks a complete organizing principle, a format. Architectonic thinking means that the designer always deals with the relation between the parts and the whole: “where every detail is as important as the whole” (Stolterman, 1999, p. 8). As of now, the training of design students is focused on developing analytical and logical skills, which can lead to tectonic ways of thinking (Stolterman, 1999), and as described above, the same can be said about the tools that design researcher’s prescribe for design practitioners.

3.3 Imagination and judgment

Given objects are the objects that we can perceive with our senses. Non-given objects exist only in the designer’s mind. The purpose of a design process is to transform non-given objects to given objects and is thus the realization of the designer’s ideas (parti).

In order to do this successfully, the designer needs information about the current situation, but these descriptions must be achievable in a short time and must cover the wholeness of a situation. The traditional modes for inquiry used in science are to an extent useful and necessary to collect information about the existing situation, but insufficient in transforming non-given objects to given objects. These tools, that serve to describe and explain, can never prescribe what action to take in any design situation (Nelson and Stolterman, 2003).

Imagination and judgment is needed when describing the present situation, because every description is based on choices of which aspects of the situation that are judged relevant and important enough to emphasize. There is no straightforward way to describe reality and to say; ‘this is how it is’.

If a designer wants to create something new (and not make a copy of something that already exists), he or she needs to imagine. Kant describes the imaginative formulation as something that: “does not have its cause in real representation but arises from an activity in the soul” (Makkreel, 1990, p. 15). It is not just about coming up with new and creative ideas, but the designer must also imagine what variables, parts and aspects that are important in a specific design situation (Nelson and Stolterman, 2003).

Judgment is a kind of decision-making that is not dependent on rules of logic inspired by rational systems of inquiry and strict rules of reasoning (not the decision-making of the ‘economic man’). Instead, it can be viewed as “the accumulation of the experienced consequences of choices made in complex situations... judgment is knowing based on knowledge that is inseparable from the knower” (Nelson and Stolterman, 2003, p. 181, and p. 184).

Judgment is not the same as intuition (which is more related to a view on the designer as a ‘creative genius’), in that it does not shy away from reflection, fearing that it will interfere with creativity. Nelson and Stolterman (2003, p. 182) claims that judgment is something that you learn and can apply in design circumstances, without destroying the designs essence and value. The ‘bricoleurs’ judgment contains knowledge, gained from experience, about how each problem should be tackled (Fällman, 2003).

Stolterman (1999) claims that designers have a well-developed set of skills when it comes to given objects, but that this is not the case when it comes to non-given objects. The focus in science has been to achieve new knowledge about reality, and not on changing and
creating a new reality. This has also been the focus of design research while skills for creating the not-yet existing include imagination and judgment.

3.4 Systems thinking

When the Apple iPad was introduced on the American market this led to difficulties for the Swedish customs. Swedes traveling from the US had bought with them the new device that was not available in Europe at the time. The issue was whether it should be treated as a computer, a monitor or as an electronic book reader. The English customs had classified it as a computer, but their Swedish colleagues disagreed, stating that a new artifact should be classified according to its “main purpose”, which could not be determined by looking solely on different components. This posed a problem because the customs personnel had not had the opportunity to look at the thing first-hand. Their temporary solution was therefore to classify it as ‘miscellaneous electronic equipment’ (idg.se).

The approach of the Swedish customs is interesting because they seem to have the idea that you cannot look at the parts of an artifact in isolation to know the purpose of it. Only when looking at the actual artifact as a whole, consisting of interrelated components the emergent qualities become apparent (the artifacts main purpose, what it “is”). It is the format that signals the emergent qualities.

This way of thinking is called systems thinking. Churchman describes systems thinking in the following way (1968 p.11): "Systems are made up of sets of components that work together for the overall objective of the whole. The systems approach is simply a way of thinking about these total systems and their components”.

This is also something described by Xu (1995) who claims that a system cannot be explained solely on the basis of its subsystems. Numerous different interactions occur, for example between systems and subsystems, within systems and subsystems and between systems and its environment. The meaning becomes apparent when the total system is assessed. It seems natural that systems thinking is a good way of approaching design complexity, and its inherent wicked problems.

Boehner et al. (2007) describes two different stances that the designer can have when interpreting a design space (discussed in the context of cultural probes). The first one is to view it as getting inspiration or glimpses of particular lives; to open up a variety of possibilities. The second stance is to view interpretation as information, where the aim is to pinpoint the exact needs and requirement of general communities. Interpretation in this case is to strive for the one, correct and unambiguous understanding, while the former view is to have a dialogical view on interpretation. In the dialogical case, interpretation is seen as the designer responding to what the respondent expresses. The designers express themselves in the tool (the cultural probe), participants interpret the designers interest and intentions and express themselves in the responses, that the designers respond to by expressing their interpretation in potential design ideas. This expressive and interpretative process is iterative, and the designer never tries to come up with the true meaning of any particular response. The example of the cultural probe shows that a dialectic approach embraces
complexity, without reducing it, and that we should see the design space as a source of inspiration, instead of information that can be reduced and calculated.

The systems approach is even more important when the designer wants to create something new than when he or she wants to describe something that already exists (Nelson and Stolterman 2003). There is no way around the fact that a new artifact will affect and be affected by the real world. The systems we are creating, as well as the world that the systems belong to are interconnected in a way that obsolete reductionist ways of designing. If we deduct parts and components, we lose our understanding of the system.

Another reason for systems thinking is that humans only find meaning in the things that are connected and in relationship with other things (Nelson and Stolterman 2003). Things that stand alone without a relation to its surroundings have an intrinsic value, but in order for it to have a meaning it must have relationships that are valued by humans.

This is illustrated by Nelson and Stolterman (2003) in terms of analog and digital. Analog is when a form, process or experience is perceived as undifferentiated and continuous, while the digital is an analytic and differentiated perspective. The analog experience is what creates meaning for people as opposed to the digital that disrupts the flow of meaning making. The man-made objects affects our life’s and must be analog in order to be part of the flow of life rather than disrupting it. Digital is when there is a lack of consideration of the complexity of the context surrounding the artifact. The designed thing should be related in a meaningful way to people’s activities, social and spiritual life.

Krippendorff (1989, p.12) writes that: “meaning is a cognitively constructed relationship. It selectively connects features of an object and features of its (real environment or imagined) context into a coherent unity”. He claims that if this is true for how ordinary people make sense of things, the same thing can be said about designers because they are equipped with the same cognitive abilities. Designers engage in a professional process of sense-making and should discuss not only the context in which their forms are used, but also what they mean to someone other than themselves.

### 4 Composition and tools

#### 4.1 Composition

As a verb, the Greek origin of systems is a derivative of the compound term sunistantai, meaning: ‘to bring together’ (Nelson, 2008). The focus for the design practitioner as a systems thinker is thus how people and things are caused to stand together through an intentional process of imagination and judgment.

This view on the design process as making a composition is coherent with what Stolterman (1999) describes as architectonic thinking. Architectonic thinking is to care for the different parts in the design, as well as the whole. The same connection can be seen to systems thinking, and the “bricoleur” as someone who recognizes the messy-ness of complexity, and engages in a hermeneutic process of interpretation and meaning-making to create a particular design. “A design is always a composition. To design is to be creative and
innovative, but more importantly, design is to cause things and/or people to stand together as a unified whole – a composition” Nelson and Stolterman (2003, p. 207).

As described above, a parti is the early vision of the design, while a format is the gestalt; possessing emergent qualities of the combined components in the final, implemented, design. The obvious issue then, is how one can make these emergent qualities possible to design, before the designed thing itself is constructed. These qualities will be explicit when the thing is constructed, but then it is too late to do anything about them.

The designer should be able to make a composition in such a way that he or she is aware of the emergent qualities of the format, before the construction. This means that the designer becomes aware of the role of the parts, functions, structures, processes and forms in the design process. Stolterman (1999 p. 12) writes that “the process is about the creation of an image, of the whole, of a gestalt”. I have chosen to call this activity the embodiment of a format (or format embodiment). The designer’s aim is to implement the parti into a desired format. This is done with the kind of thinking and acting discussed above, but it also involves using tools to be able to embody the format a priori the design implementation. By doing so, it is possible to design the emergent qualities.

4.2 Tools to support format embodiment

The importance of successfully moving from a parti to a format is something that is not reflected by the tools (methodologies, methods, techniques, tools) that are promoted by HCI researcher’s for designers of information’s systems (Stolterman, 1999; Rogers, 2004). There are tools that are important at the early stages of the design work, such as creativity techniques (brainstorming, future workshops, envisioning techniques etc.) for creating a parti. There is also techniques for later activities in the design process (for designing databases, basic communication structure design etc.), and communication (design dialogues, team building techniques, presentation techniques etc.), however, these techniques are not focused on aiding the designer to reflect on the roles of components in the whole design, something that is required for format embodiment.

This lack of tools for format embodiment is also something recognized by Landay and Myers (1995), who claims that tools for interface design forces the designer to bridge the gap between how they think about a design and the detailed information they are required to supply to the tool in order for it to reflect their ideas. For example, the designers idea of an interface may require an, at the present time, unknown array of functions in palette. The designer wants this to be reflected in the interface tool, but the tool forces the designer to specify exactly the kind of features needed. In doing so, the tool “skips” the process of reflective format embodiment where the components are composed together.

This is one of the heritages we got from the persistence to transfer the scientific method onto the design process. In science, the truth is believed to relieve itself if the scientist follows the method precisely. These methods are good at showing patterns, relationships etc. reducing complexity in our existing world to make interpretation easier. However, this means that the researchers do not recognize the designer’s need for composing something new.

Boehner et al. (2007) writes that there is a common aim within HCI to turn reflective and interpretive methodologies into formal, packaged and objective methods. According to
the authors, this strive can make the merits and intentions of these reflective and interpretive methods, obsolete.

Coyne and Snodgrass (1995, p. 38) describes that these design methods are based on metaphors and analogies: “relying on measurement, number, ratio, and symbols which may be manipulated through the models of geometry, mathematics and formal logic”. Although valuable in science, these tools are no good when a designer creates something unknown, in this case the embodiment of a format showing the gestalt of something that does not exist.

According to Stolterman (1999) we can find inspiration for interaction design tools for format embodiment by looking at other design disciplines like architecture, urban planning and industrial design. In these disciplines, sketching is at the core of the design process, and enables the designer to work back and forth between the details and the overall structure.

4.2 Sketching

Fällman (2003) proposes sketching to be an archetypical activity in all design work. Sketching is a middle ground between the early vision about how the system should be (the parti) and its realization as a final system (the format). The designer experiments with the components and can see the emergent qualities of different configurations before the implementation. Therefore, sketching is not merely a visualization technique, but also a way for the designer to shape the emergent qualities in the new system, in other words a, tool for format embodiment.

Using sketching to work out a coherent whole means putting ideas to use (externalization) but it also means that these ideas are put to a test (interpretation). This way of using a tool is in alignment of the view of the designer as a ‘bricoleur’; understanding the role of different components and compositions through dialectic interpretation.

Goldschmidt (1991) claims that sketching is more than just external representations of the designer’s mind. She describes design as an interaction of arguments and moves, where “arguments are the labors of the designer’s mind, the exploration of the task and the reasoning about it. Moves are the physical motion engendered by the arguments... The architect’s moves produce the drawings and they supply essential new food for the arguments.” (Arnheim, 1993, p. 15).

The sketches are tangible visual percepts, and their relation to the arguments is the principle concern of the discussion (i.e. the dialectic process). She describes this iterative process as: “the oscillation of arguments which brings about gradual transformation of images ending when the designer judges the sufficient coherence has been achieved.” (Goldschmidt 1991, p.123).

The arguments are thus tested in relation to the designer’s guiding image (parti), until a harmonic coherence among the components is created. When the designer sketches, he or she supplies the mental image (parti) with the assistance of an optical image (the sketches), which is tangibly concrete even if the sketch itself is fussy or vague. Arnheim (1993) writes that the sketch is a reflection of the parti but that it cannot be identical with it. The sketch therefore possesses a quality that makes the designer reflect on what has been done, and what needs to be done.
fallman (2003) proposes that sketching is the way designers think, and a way to shape new ideas. Thus, sketching can be seen as a mode of inquiry rather than a tool for externalization.

4.3 embodying a format in interaction design

As discussed above, the designer need a material that “talks back” to the designer to enable the composition of a coherent whole, a format. For a number of design disciplines, this tool has been sketching.

as pointed out by stolterman (2008), newman et al. (2003) and fallman (2003), interaction designers use sketching in the same way as architects when they compose a design. this highlights the importance of a tool with these kinds of qualities.

i would claim that interaction designer’s also require other tools that can be used in order to intentionally compose other components involving interactivity, temporality, tangibility, immersion, sound and haptics. harrison et al. (2006), relating to the situated perspectives paradigm that since interaction is an element of situated action in the world, the understanding or construction of the situation is the main focus of the design.

a different issue is the interrelations of components in interaction design, when one design decision of a component in the artifact (e.g. the placement of the buttons for ease of use), has an effect on a different component (e.g. the size of the phone) which in turn affects the emergent qualities of the phone (e.g. this is an ugly phone), as coyne and snodgrass (1995, p. 38) writes: “during design, as one misfit is eradicated, another occurs”.

it would seem like a good idea that the designer has a tool that enables the design of these components “all together”, to be able to reflect upon the consequences of different compositions, in specific situations. in architecture, the form and structure is embodied with sketching, but in interaction design it becomes trickier: how do you sketch interactions, and other related factors of importance in the interaction design process?

stolterman (2008) summarizes research conducted by schön, krippendorff, and others that gives an indication of the kinds of tools that are used and appreciated by interaction design practitioners. these studies gives an indication regarding how interaction designers go about to tackle the challenges in the design process. the interesting tool characteristics, in the context of format embodiment is that these tools enables the designer notice complexity and reflect upon complexity in new ways. as described earlier, successful format embodiment is to compose the component in a way that creates the desired format. in order to do so, these tools allow the designer to be able to reflect on the role that these components play in the design as a whole.

the summarization of the tools used by interaction designers gives an indication that format embodiment indeed is as a mayor and important activity in the design process. it is then striking to see that many design researchers, due to the view of the designer rationality as a ‘economic man’ or ‘creative genius’, seems to have overlooked this when proposing tools for practitioners (rogers, 2004; cross, 2001). having said this, the study also reports that there are tools that do support this activity, and by describing a pair of them i hope to
illustrate what makes them good in the activity of format embodiment for interaction designers.

An example of such a tool is scenarios, which help interaction designers see the structure of problems, and seeing issues from different perspectives (Carroll, 1999). Scenarios are useful because they enable the designer to reflect on consequences of different design decisions before the actual implementation. Scenarios is also a rich tool that capture concepts that are of importance in interaction design and thus make it possible for the designer to embody a format, because just as sketches, they supply “essential new food for the arguments” (Arnheim, 1993 p. 15). In sketching, the designer engages in a conversation with the material (i.e. the drawings showing the structure and form). When using scenarios, the designer engages in a conversation with the stories concerning the use of a suggested design. These stories can be constructed in all kinds of ways, including how people use and interact with the design. While having a different scope, similar with sketching, the designer gets feedback from the scenarios to reflect about good or bad design suggestions and compositions, and provides new insights to the designer.

Another example is Cultural probes (Boehner et al. 2007), which are designed to expose the respondent to a number of speculative possibilities, which would lead to positive or negative responses. In this case the material of conversation is the users responses, which lays the foundation for a dialogue regarding factors regarding, among other things, the very rich context of use.

Similar for these tools are that they shows an acceptance of design complexity, and that they use tools that allows them to see more of the complexity, and to see it from different angles. Furthermore, the tools are dialectic, and make the designer reflect upon complexity in specific contexts.

Although these tools, as well as other, are highly valuable in the interaction design process, there seem to be a lack of tools for format embodiment stemming from HCI research (Rogers, 2004).

5 Summary

In this paper, I set out to explore if different approaches to complexity could explain why interaction design practitioners shows a lack of interest in the tools proposed by mainstream HCI research. I found that different approaches to complexity were one (of possibly more) reasons why the view on design rationality was different between design researchers and design practitioners. To view design rationality in a certain way, is to have presumptions regarding what the design process is all about; what it means to design and be a designer. So, when researcher’s views design rationality as the ‘economic man’ this leads them to propose reductionistic tools for handling complexity. Out of this complexity, the one and true design is believed to emerges when tools reveals patterns and relationships.

I propose that we instead should view the designer as a ‘bricoleur’, and as such, someone who recognizes complexity, and who engage in a dialogue with the materials at hand in order to compose a particular design for this particular situation. As a “bricoleur”, I suggest that designers uses systems thinking when they acknowledge the interdependence of components,
and that different compositions leads to different emergent qualities. Furthermore, I use the terms parti and format to describe the place of composition in the design process, and the importance of a strong and desired format.

I then move on to describe how the designer creates a composition, and how this relates to the other concepts I have described. I show that the tools that are needed, and used by practitioners, are tools that that support the designer to notice, and reflect upon the complexity in the design space. I then acknowledge that there exist tools with these qualities, but that interaction design requires complementary tools that address the complexity inherent to interaction design.

References


