Criticism as an Approach to Interface Aesthetics

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ABSTRACT
In this paper we discuss the re-orientation of human-computer interaction as an aesthetic field. We argue that mainstream approaches lack of general openness and ability to assess experience aspects of interaction, but that this can indeed be remedied. We introduce the concept of interface criticism as a way to turn the conceptual re-orientation into handles for practical design, and we present and discuss an interface criticism guide.

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Interface aesthetics, interface criticism, formative assessment.

ACM Classification Keywords
H.5.2: User Interfaces Evaluation/methodology, User-centered design; H.1.2: User/Machine Systems, Human factors; D.2.2: User interfaces.

INTRODUCTION
The aim of this paper is to discuss how human-computer interaction can be understood as an aesthetic discipline, and further to demonstrate that such a new perspective is a possible basis for operational interface evaluation methods. To support the argument we introduce the concept of interface criticism, and we propose an interface criticism guide. The tenet behind the argument is that today's dominating perspectives on interactive artefacts focus almost only on technical and cognitive aspects, and consequently the field needs to take a cultural and aesthetic level of analysis into account in order to be able to address issues like design for unanticipated use or design of cultural interfaces.

With the popularity of the PC and the web the interactive artefacts have spread from being efficient, functional tools at the workplace, to become a medium for cultural activity. Today, interactive artefacts are important media for producing, consuming and interacting with cultural data,

e.g. on the web, or in computer games. Furthermore, it is also a cultural medium in its own terms, in the sense that interacting with interactive artefacts is an increasingly important cultural activity, e.g. in open source culture, when people spend hours setting up and personalizing operating systems, software packages, plug-ins, or when interacting with digital art forms such as net-art and software art. Interactive artefacts entered the cultural sphere long ago – this trend is accentuated by the current developments towards pervasive and ubiquitous computing. In fact, still larger parts of IT business and development are guided towards the cultural domain; in order to understand this, HCI needs an aesthetic dimension.

Historically, cognitive psychology was the important conceptual basis for HCI [e.g. 12]. Traditionally, empirical studies in HCI have been modeled over the controlled psychological laboratory experiment, aiming to identify general features of human action with a general computer-based artefact. Gradually, faster and more practically accessible methods evolved into today's methods that are most often considered an integral part of the design life cycle, i.e. formative evaluation [29].

The cognitive walkthrough [32] is a well-known example of a contemporary interface inspection method that is simple and cost effective to use and to learn. Despite these qualities, it is an increasing problem that the method assumes that the user is engaged in a rational process of exploratory learning when trying to use the considered artefact, thereby ignoring that the user is more often engaged in a hermeneutic process of interpretation. Thus, in many less obvious cases, the cognitive walkthrough does not provide effective means for the inspector to answer the questions about visibility etc. Thus, the inspectors will either be guessing based on their own experience and preference, or they will need to engage in a complicated process of more or less systematic alignment with the users' possible interpretation. With the penetration of interactive technology into all aspects of life this interpretation becomes even more important.

In the history of HCI the cognitive approaches have been questioned by participatory design [25, 42] and similar approaches that have introduced a greater realism by emphasizing that analysis, design and evaluation should be performed together with real users in a real setting, as an iterative explorative process. These approaches emphasize tool-like mediation in a given practice, and typically, the

"unit of analysis" is the work situation [18]. Thus, most current approaches, including participatory design, assume that the purpose of HCI is to eliminate obstacles to the transparent interaction between user and task, and they most often confine analysis to the generic use situation or the workplace context, or they reduce the unit of analysis to the isolated cognition of individual humans.

The basic limitation of the current approaches is that the bracketing of contextual factors is too narrow. Whereas learning based approaches yield valuable new insights into the dynamic nature of interaction, the implied focus on cognition and/or social mediation at the same time limits the understanding of the sources of dynamics, often reducing the developmental perspective to progression along a fixed curriculum and social mediation in a somewhat narrow sense [e.g. 2]. The result is that it is difficult to consider unexpected use, e.g. by analyzing cultural traces of use. In addition, it is difficult to get a firm grip on users' changing expectations and experience. Obviously, participatory and iterative design to some extent compensates for this shortcoming by replacing the conceptual level of analysis with practical action. However, the basic problem is that in order to *understand* the dynamics of use as not only contingency, it is necessary to introduce a cultural unit of analysis. We need to take into account the broader cultural context in order to understand and design IT-based artefacts today, and we need to introduce perspectives on the use situation taking experience rather than cognition as the basic unit of analysis. In other words we feel that there is a need for a redefinition of HCI as an aesthetic discipline.

Questions of aesthetics are not new within HCI [cf. 31], but until recently, aesthetics perspectives have been subordinated under functionalism as the icing on the cake. Even when considering effectiveness, aesthetics matter [44], but computers and interfaces are not limited to workspaces and use situations where functionalism and effectiveness are the key. With digital art, the Internet and computer games, cultural interfaces [33] are flourishing – interfaces that are not transparent or functional but evident, quixotic, and highly visible. During the recent years researchers at e.g. Royal College of Art [17, 24], Play Research Studio [40, 41] and ID Studio Lab [16] have made contributions to HCI that give aesthetics another more prominent role. As e.g. Dunne [17] and Ehn [20] have argued, HCI and interface design need to learn from architectural theory and non-digital design in order to broaden the scope and introduce alternative perspectives challenging the focus on usability. This paper takes part in this work and takes the full step of seeing aesthetics as a new paradigm for HCI.

AESTHETICS AS A NEW PERSPECTIVE ON THE INTERFACE - FROM USE-ORIENTED TO EXPERIENCE-ORIENTED
We propose that aesthetics could be a new foundational concept for HCI: taking aesthetic theories of representation, experience, and sense perception as basic categories. However, aesthetics is a broad field, and we will use the following lines to express which understanding of aesthetics we aim for here.

Aesthetics can as a field roughly be separated into classical and modern aesthetics. From antiquity until the modern age aesthetics was dominated by normative rules and guidelines on how to make beautiful, harmonic, fitting art works. But from around 1750 aesthetics developed into theories of perception, aesthetic judgment, and art [6, 26, 28]. Later aesthetic theory has, while still focusing on art, widened the scope to become theories of representation, sense perception, experience, and modern culture [e.g. 3, 7, 15, 21, 35]. An important insight is that (post) modern reality is intrinsically mediated, and that representational issues are a defining part of (post-)modernity.

Whereas the classical normative aesthetics bears some parallels to the many guidelines within HCI, we propose that HCI also needs to look into modern aesthetics and its knowledge on modern culture and representation. Modern art is seen in close relation to modern media in the media aesthetic branch of aesthetic theory [7, 10, 35, 38], and modern art is in this understanding concerned with how the representational techniques of modern media change our perception and experience. A modern art work might often disturb our preconceived expectations in order to make us see *how* we see. Modern art often teach us to see the transient, fleeting and contingent modernity, it shocks the eye into seeing anew [5, 11]. In this perspective, modern art is about understanding how sense perception became mediated in modernity, and it is about reeducating the senses for this complex situation.

A way to understand the dialectics between art and perception is offered by Wartofsky [45]. In his account of the historical development of perception, he identifies art as being tertiary artefacts, i.e. representations that in an indirect way are derived from the productive acts with primary and secondary artefacts (tools and representations of tool use). Tertiary artefacts are detached from, but feedback into, productive practice by reshaping human perception, thereby changing action in productive practice. This understanding of the role of art is in line with (or rather part of) modern aesthetics outlined above, and it explicitly links an understanding of art to a theory of how practice is mediated and developing.

Apart from the media aesthetic branch of aesthetic theory, the aesthetics we propose is based on digital aesthetics. Theories of digital aesthetics have evolved within the field of aesthetic theory, especially since the PC was popularized, drawing on modern aesthetic theories from e.g. Barthes [14, 30], McLuhan [9] and Benjamin [10, 36, 38]. Especially the developments of Benjamin focus on how digital art and aesthetics explore and develop a critical insight into the media and mediated perception, and how a new formal language is developing. Manovich [33] has

developed a widely accepted, general framework for digital aesthetics, which also relates digital aesthetics to software and interface development. Following Johnson [27] and Bolter & Gruisin [9], he argues for seeing the interface in relation to a general interface culture and launches the concept of the cultural interface that is in opposition to the general control interface.

Within HCI several earlier attempts have been made to use concepts from aesthetics to solve problems at various levels, in this paper we argue for keeping the field open for further exploration. Especially two things seem valuable: Firstly, the consideration of the relations between HCI and the treatment of representational issues in modern aesthetics (especially in media aesthetics and digital aesthetics), as described above. Secondly, in order to transform aesthetic re-orientation of HCI into an operational method for design and assessment, we will in the following look at criticism as an alternative to traditional assessment methods within HCI. The introduction of interface criticism aims to enable HCI to draw on insights from cultural analysis and contemporary aesthetics.

INTERFACE CRITICISM AS A PRACTICAL APPROACH TO INTERFACE AESTHETICS

Bringing interface aesthetics to use in practical design requires that the conceptual redefinition is transformed into operational (preferably procedural) resources that can be used in practical design. The interface criticism guide is a demonstration of one possible approach to such an operational resource for formative assessment.

One of our ideals for the interface criticism guide has been the cognitive walkthrough [32] because it is cost effective and easy to learn. However, as discussed above, the drawback of the theoretical lightness of the cognitive walkthrough is that the inspector does not get any help in less obvious situations. Consequently, we aim to strike a balance where we describe a practical procedure, but at the same time realize that interface criticism cannot, at least not at the present stage, be performed without some basic knowledge about aesthetics and literary or art criticism. The aim with the guide is to suggest a design-oriented procedure utilizing aesthetic perspectives on the interface.

Who

The person performing the interface criticism should have at least some basic knowledge in aesthetics, and ideally some experience with art or literary criticism. Thus, we do not claim or expect that the average systems engineer will be able to follow the procedure without prior training. However, based on our experiment with letting students apply the interface criticism guide described below we believe that most design teams will benefit from the application of the criticism guide.

When

As part of a specific development project, interface criticism is a method for formative assessment (or evaluation). Thus, an interface criticism can take place as soon as the specification has been detailed into interface sketches, such as storyboards, and it makes sense to do, as long as there is still openness in the design. Interface criticism can take place as an ongoing process in parallel with the rest of the design activities, with a focus changing in accordance with the gradual refinement and closure of the design. Finally, interface criticism can be an activity aiming for the production of general insights into contemporary interfaces, thus contributing to a broader interface aesthetics discourse as a new resource for design.

How - Procedure

Interface criticism has no inherent granularity of analysis (e.g. like the task analysis in the cognitive walkthrough). The perspectives in the interface criticism guide can be treated for the entire interface in one step or the interface can be broken down into parts, it can be broken down along the structure of a task analysis of typical tasks. Often a good critique will focus on one or a few central perspectives and subsume other aspects under these, as is the case in literary criticism, since they cannot be seen as distinctly separate, but definitely overlap as slightly displaced perspectives on the same aesthetic issue. The choice of strategy depends highly on the complexity of the interface. In any case it is important to take both the perspective on the interface as an integrated whole and a detailed perspective on its parts. Interface criticism will benefit from the parallel application of standard methods. Interviews and think aloud testing can be data sources, and the criticism can provide focus when planning assessment with standard methods. Thus, the general procedure consists of iterations over the items of the criticism guide alternating between looking at the interface as a whole and focusing on the details.

What - Product

The product of interface criticism is most often a report written in prose, possibly with graphical illustrations pointing to parts of the interface and to other interfaces with which the interface is compared. The report can be structured thematically, along the structure of the interface or in some other way suited to convey the insights.

Why - Outcome

The insights generated in the interface criticism will concern the specific interface and at the same time, it will contribute to the development of theoretical and historical meta-perspectives. The specific insights will provide the designers with an increased understanding of the basic use qualities to expect from the interface, in particular an understanding of the types of representations in the interface and the openness to and support for development in use, and adaptation to changing contexts of use. The criticism may feed back into design, more specifically, by pointing to inconsistencies in the interface or between the interface and its surroundings. Finally, the criticism will give the designer and HCI researcher better tools to handle the computer in cultural terms.

THE INTERFACE CRITICISM GUIDE

The interface criticism guide consists of the following items, which are based in the above outlined media aesthetics and digital aesthetics. Furthermore, we have selected these perspectives because they have proven to be operational; however we make no claims about the completeness of the guide, and future interface critics may as mentioned focus on few perspectives or expand the guide with new perspectives.

- Analyze stylistic references in the interface.

- Identify the use of standards and the conformance to tradition.

- Materiality and remediation. Consider the materiality of the interface (e.g. code, algorithms, pixels) and discuss how it is used. Consider how the interface draws on the materiality of other media (e.g. text pages, photography, cinematic language, control panels). Discuss immediacy and hypermediacy in the interface.

- Identify and consider various genres in the interface.

- Discuss the interface as a hybrid between the functional (control interface) and the cultural interface.

- Identify representational techniques and analyze how they work (e.g. realistic and naturalistic representations vs. symbolic and allegorical representations).

- Identify challenges to users' expectations.

- Consider the developmental potentials. How is development in use supported? How may the interface support the development of unanticipated use?

Each item is explained below together with examples of what the resulting findings could be.

We have tested the guide with our classes at the interdisciplinary multimedia education. Students have a variety of educational and professional backgrounds, including undergraduate studies in fine arts, informatics, or computing. With a brief introduction, they used the guide in one of their obligatory assignments where they wrote a criticism of a work-oriented application. When giving the assignment we feared that we were being too experimental and that the aesthetic interface criticism would not make sense, and that it would not provide any results for the students. Although many of the students at first expressed their discontent with the idea, all, but one, of the groups were able to produce findings they had not identified through their previous use of standard methods on the same applications.

In the following we will refer to examples from the students' interface criticisms. Furthermore, we have chosen to illustrate the guide with a common word processor as the general example. We use the word processor Microsoft Word (hereafter Word) as example as it is likely that the reader knows the example, and to emphasize that interface aesthetics concerns any computer artefact, not only entertainment, or artistic oriented computer artefacts. In the

discussion we aim to demonstrate the interface criticism guide's power as an analytical tool, though we do not aim for a comprehensive critical analysis of the specific word processor. We found Word interesting because it has already been the subject of aesthetic criticism in a book that calls for a general software criticism [23], though Fuller's criticism is not primarily design oriented. Furthermore, Word is interesting as a work-related office tool, which clearly implies aesthetic and literary values, but to a large extent these values are not part of the design.

Aesthetic theory consists of ways of discerning a range of representational techniques describing their characteristics, workings, historical and cultural references, etc. Many of these have implications for HCI and interface design, and we suggest that discussing interfaces in these terms will bring HCI forward, though one should also reflect critically on how these particular concepts are suitable in the actual design-oriented analysis.

Stylistic references

Analyze stylistic references in the interface (e.g. Mac OS vs. X11, renaissance vs. baroque).

All interfaces inherit styles from their predecessors and from the normative guidelines in the HCI field. Probably the most well-defined style in interfaces has been Apple's Human Interface Guidelines, whereas Microsoft Windows has become a more widespread variant. Within these dominant styles there are whole canons of styles, e.g. Mac OS 9 vs. Aqua or Windows 2000 vs. XP. Besides, richer variations and experimentation occur within the more anarchistic Unix/Linux environment (e.g. [22]). Even though standardizations occur, the twenty years of GUI development have also lead to the gradual occurrence of something that looks like fashions (e.g. the liquid Aqua style), and soon GUIs will probably be integrated in the general cultural economy of individual fashions, retro styles, underground vs. formal styles, etc. The emergence of skins might be a first sign on this.

Stylistic references can also be considered with respect to art and architectural history, e.g. one can identify baroque deviations from the dominant renaissance window style, or perhaps even versions of romanticist idealism unfolding on one's desktop [13].

One group of students analyzed renaissance versus baroque styles in a web-based calendar system, and was on the track of discussing how the two styles relate to immediacy and functionality in the interface. In this sense, a focus on transparency and realism leads to a renaissance style, whereas a focus on functionalism leads to more baroque styles.

Word can be seen as renaissances in the sense that it builds on the tool metaphor and aims to incorporate a WYSIWYG interface. However, the abundance of new functions and domains, such as the inclusion of DTP functions, web publishing, support for reviewing and collaboration, has led

to a baroque mannerism in the interface. As pointed out by Fuller, Word has since its early editions swollen "like a drowned and drifting cow" [23] with now 19 toolbars (Word 2002, Windows XP), so even with a large screen and high resolution there is hardly space for writing if all toolbars are visible. Besides, there are animated characters, audio feedback, auto-text, auto-formatting, auto-corrections, and online discussions competing to take over one's attention. Furthermore, the interface is divided into groups, tasks and hierarchies of subtasks [23], making it a highly functional grid that challenges the ideal unity of the interface, a development which could be compared to that of baroque architecture.

One can neither explain, understand nor improve this, if one does not understand how software and computers have changed writing and the culture around it. From putting words on paper, writing is now a hybrid of practices ranging beyond traditional writing, as we know it from the typewriter, to outline editing, typography and layout, web publishing, programming, multimedia editing, accounting, mail merging – all this intricately coupled with experiencing the software, playing around, exploring new functions and ways to do things. Since writing today is a hybrid practice involving these elements, the solution is not a renaissance simplicity in the interface, but more a baroque hybridity, which Word already implies, though perhaps more because of the way things have evolved than because of a conscious design choice. Understanding the stylistic development from renaissance to baroque – a development that is not only referring back to the 15th, 16th, and 17th centuries but is relevant whenever new expressions develop, mature and decay – is key to envisioning new designs for hybrid tools such as a word processor.

Standards
Identify the use of standards and the conformance to tradition.

Following the above, it is relevant to identify standards and discuss whether the interface conforms to these. However, one should not automatically conclude that conformance to standards is desirable. Well-considered deviations from one standard or mixture of several standards might be useful as long as there is an awareness of the traditions and standards involved. In fact, with twenty years on the market, the GUI has developed several traditions that can be turned into palettes of expression for the innovative designer.

One student group developed an interesting critical discussion on how the interface of a project management software tool (called MinuteMan) could be seen as a pastiche on Windows that did not dare to go beyond the standards, but on the other hands could not fill them out in any meaningful way either: "Like a movie set it is all frontage." (Unpublished student rapport).

During its development Word has been a primary link between the Mac OS, which it was developed for, and MS Windows, transporting interface standards back and forth. Besides, with the growing integration of Word into the MS Office suite, one can increasingly find elements from and limited versions of the other Office components, e.g. as toolbars (database) or specialized views (web page view). The discussion of standards could be used to heighten the awareness of their origin, and of the fact that not all standards should be followed automatically, but that there is a rich palette of expressions.

Materiality and remediation
Consider the materiality of the interface (e.g. code, algorithms, pixels) and discuss how it is used.

Consider how the interface draws on the materiality of other media (e.g. text pages, photography, cinematic language, control panels).

Discuss immediacy and hypermediacy in the interface.

An interface is basically a layered structure with layers of code where the top layers are progressively oriented towards the human while the bottom layers address the machine. At each layer, and between the layers, the interface translates and negotiates between the machine and the human. This translation leaves traces that are perhaps most visible when the machine breaks down or when a breakdown of communication occurs. Such traces are of course not desirable when designing a user-friendly interface. Still, the translation should not always strive to be automatic, smooth, and seamless. We need critical interfaces that give the user insight into to the workings of the machine and software, which would also give the user better possibilities to develop unforeseen and 'un-designed' uses. This does not mean that everybody has to become programmers, but users should be aware that they are communicating with a machine in order to obtain a good understanding of the possibilities and demands of the interface. Furthermore, in order to reach a level of virtuosity the user needs to be able to grasp the representational techniques at work in order to play with them or perhaps bypass them. In this sense, we need deconstructive interfaces that demonstrate their own construction perhaps under the slogan "What You See is What it Does". Here standard interfaces can learn from computer games, where it is often important to be able to bypass some of the representational techniques for virtuosity, and in some recent computer games (Max Payne, Metal Gear Solid 2) the interface is deconstructed as part of the game's postmodern experience.

The modern GUI is a remediation of other media such as the medium of the printed text page, cinema and the control panels of machines. These older media are turned into genres in the GUI, which often consists of both pages with text and textual input, cinematic screens, where one navigates in space using the grammar of cinema, and button controls that appear almost like mechanical control panels [33]. Still one can distinguish two opposite styles, where

the interface strives towards either immediacy or hypermediacy [9], i.e. towards transparency or towards multiplying the signs of mediation. An example of the former is virtual reality, of the latter multiple windows.

If we consider the development of interfaces as an aesthetic tradition, it becomes clear that innovation occurs when the materiality of the interactive artefact is used in new manners or when old media are remediated in new ways. Important examples are the GUI itself, its current development towards more hypermediacy (Mac OS-X and Windows-XP) or the open source development.

Even though one can find animation (the office assistant) and controls, text is obviously the important remediation in Word, and with text we find a finely tuned range of textual remediations. As discussed above, the concept of writing is changing dramatically these years. As pointed out by Ong [37], a "technologizing of the word" is occurring, and MS Word is a prime example of this, incorporating most of the instances of this development as material metaphors, ways of working or views: Word has limited ways of working with speech and handwriting (though PDAs and tablet PCs are of course working with this), but later developments such as print, typography and the offspring of print technology such as indexes, lists, bullets, footnotes, and cross references are important elements in Word – even to the extent that these elements are promoted as ways of writing. Word promotes to a large extent a typographical writing, where the typographical layout on the page becomes an important part of composing and writing the text, something only writers of concrete poetry did earlier. Furthermore, Word enters the domain of the text as code, i.e. field codes, format codes, HTML codes, etc. However, Word does not take the full step and allow the writer to become a programmer, most often the codes that are automatically generated are hidden - out of direct user control. In this sense, the user has only limited control of typography, and the programmed dynamic behaviors of the text. This occasionally causes confusion and frustration.

MS Word takes advantage of the development in writing's material support from the text scroll, to the static printed page, the programmed web page, and the pseudo-hypertextual outline which governs its views (Normal, Web layout, Print layout, Outline). The next obvious view would be a code view, as we know it from HTML editors or other word processors (Word Perfect, LaTeX). Perhaps considering such a view would lead to a complete redesign of the application; a new MS Word supporting a clear choice between different material metaphors, and clear indications of how these metaphors overlap, clash or subvert each other. Today the simulated paper in the Print layout view is in a sense too convincing and hegemonic, since one cannot directly manipulate the paper, but only the text, e.g. one has to go through several menu hierarchies to change the size of the paper. Perhaps allowing for different views next to – or semi-transparently on top of – each other would help the writer to better understand the possibilities

of contemporary writing - how these possibilities overlap and confront each other.

Several of our student groups put the dichotomy of immediacy/hypermediacy to good use and identified how these seemingly conflicting representational strategies are negotiated in the interfaces. One group discussed how an electronic map switched between the materiality of the map and bypassing the map into other spatial representations. This parallels Word's different views, but probably Word would further the user's understanding of the task of writing and its possibilities by designing more in the line of hypermediacy than the immediacy of WYSIWIG and simulated paper.

Genre
Identify and consider various genres in the interface.

In literary theory, genre is the way to handle the reader or user and his expectations. By establishing a genre contract, e.g. by writing "novel" on the title page of a book, the author enters into a tradition which she then applies in a more or less innovative way. Besides, the reader subscribes by dispending his disbelief, and by more or less consciously occupying the role of the implied reader, designed in the novel.

In the same way interfaces design implied readers or users, who can occupy specific roles that are difficult to escape. Already several main interaction genres that define roles for the user and his interaction with the interface have occurred, e.g. the interface as a system, a tool, a dialogue partner, a medium [8] or a game, and discussions of a genre-theoretical approach is being developed [19]. With the growing interest in storytelling in web-design it becomes even more important to be able to identify and design genres. Besides, as argued elsewhere [17], there is good reason to reconsider the notion of the user and of the user-friendly interface in order to design interfaces that encourage a more independent and creative use, and we suggest the concept of genre.

MS Word clearly subscribes to the tool genre – the contract suggests that the user has control of the content, whereas Word is a neutral tool helping with the form. Still, this genre hides the close relation between form and content, that we, as argued above, write typographically when using Word, producing a text that, already when writing, looks printed (with bullets, page numbers, foot notes, justified alignment, etc.). Furthermore, the genre needs renegotiation when it comes to all the automatic functions that Word promotes, where the word processor in fact intermingles with the very content of the text. These auto-writing functions might be useful – especially if they were untied from the formal tool metaphor, if they were allowed to be creative, or help with the creative process of writing. Most writers today, especially when writing in a foreign language, use thesauri and the web to find appropriate words or idioms, even allowing for small sidetracks in the

writing process, because a certain idiom seems fitting. Some times writers even look for inspiration and material by browsing a reference book or the web. In this way, reference books and the web could be included much more prominently for creative use than the rather stringent references that are promoted today.

Word is part of the MS-Office suite, and it clearly models its writing tool genre on the kind of writing taking place in offices. Consequently, it generally supports and promotes a certain kind of business writing, where creativity is limited to the use of typographical elements such as Word Art - and perhaps on a crazy day the use of text effects like Las Vegas Lights or Marching Red Ants. Contrarily it offers no support for creativity in the cultural, literary domain. It does not offer inspirational hints (e.g. by implementing Brian Eno's Oblique Strategies), it does not help poets or songwriters by suggesting words that rhyme or fit into the meter and the rhythm, and for contemporary poets and playful souls there are neither algorithms for combinatory poetry, Oulipoan permutations [34], nor ways of programming new literary algorithms. Besides, there are no supports for reading or analysis, such as concordance based text analysis tools or views of collective readings such as the one suggested by SW/OfCD in their experimental textKit software [43]. Word presents and promotes an office perspective on writing, but writing is so much more than composing business letters or academic reports. However, today other kinds of writing are subsumed under the office perspective.

Hybridity
Discuss the interface as a hybrid between the functional (control interface) and the cultural interface.

Modern interfaces are a hybrid between seemingly contrasting values. On the one hand, the original Mac OS was introduced with transparency, standardization, functionality and abstract structures as ideal striving for order and user-friendliness. On the other hand, if we look at computer games we see evident, original, themed interfaces that on the contrary strive for experiences, narration and challenges to the user [33]. With the current fashion for experience design even the latest versions of the major operating systems incorporate values from computer games. As such, it is not correct to see the cultural and aesthetic dimensions as subordinated to the functional ones, since an important part of the function of modern interfaces is cultural and aesthetic. The computer is an important cultural machine, with which people interact and create culture and art, and across the arts a digital aesthetics is developed. Even in market terms, computer games and other cultural industries are taking the lead. Consequently, it becomes important to identify and create well functioning hybrids between the cultural and the functional interface.

Functionality versus experience at the interface is discussed by several student groups. One group discussed how the WinAmp interface is used as both a tool and as an aesthetic experience in itself, which has led to the development of skins and visualizations. This group tried to define a methodology that describes various levels in the relation between functionality and aesthetics. Another group described how the interface of Nero Burning Rom, a CD-burning software, tries to integrate a narrative and experience-oriented dimension in the otherwise strictly functional process of burning CDs, probably because of the proximity between burning CDs and the often cultural content on these CDs.

Word does something similar by keeping the experience-oriented dimension out of the 'serious' parts of the interface and saving it for the office assistant, an animated fictive character that tries to be a helping servant while simultaneously imposing an experience-oriented perspective on the software. Besides, it seems as if Microsoft uses the menus as advertisement space for new features. E.g. "Save as web page" was, when implemented, promoted to the top level in the File menu even though it is also just one of the options under the "Save As..." menu point. Still, the cultural dimensions are not integrated with the structure of Word, and with the way it supports writing itself. Today, these dimensions are trapped in the margins of the interface.

Representations
Identify representational techniques and analyze how they work (e.g. realistic and naturalistic representations vs. symbolic and allegorical representations).

In all the above, we have discussed various perspectives on representation from aesthetic theory. Aesthetic theory can in general contribute to HCI with an awareness of representational issues, and with some methods to distinguish and analyze these issues. In general there are two kinds of representations: realistic or naturalistic vs. more symbolic and allegorical representations. While the former seem to dominate the field, the latter are important when it comes to delimiting the borders of the interface. Often it could be helpful for the user to be aware of the limits of the representation in the interface as discussed above in relation to the views in Word. Interfaces that are transparent with respect to their inner working, manipulation and visualization techniques are important when the user e.g. has to know exactly how to trust the interface and to understand its workings in order to evaluate possible errors or unforeseen situations [1]. Besides, it will help the user understand how the software tool potentially changes the task she is performing. As discussed above, word processors, and interactive artefacts in general, are parts of and active agents for the radical changes that the concept of writing is undergoing currently, changes that are to a large extent hidden under the simulation of paper and pages [39].

Challenges to expectations & developmental potentials
Identify challenges to users expectations.

Consider the developmental potentials. How is development in use supported? How may the interface support the development of unanticipated use?

One of the clear potentials of the aesthetic approach to the user interface, is that modern aesthetics and literary and art criticism address challenges in the interface with much detail instead of just dismissing them in the name of usability. Thus, in assessing how the interface challenges the users' expectations, the critic will apply the earlier steps in the interface criticism guide as a resource. Also data from think-aloud tests or other empirical sources, if they exist, will be useful for the critic in the identification of challenges to expectations. In the same way data from various kinds of workplace studies etc carried out as part of general early analysis may be taken into account.

The first step in identifying the challenges to expectations in the interface could be to list elements that are likely to amuse, surprise or challenge the user in other ways. At this point it is important not to attribute too much value to each element. In the further identification and discussion, the concepts of tertiary artefacts [45] and initial familiarity [2] are suggested as useful handles. This is done by summarizing how elements of the interface can be seen as tertiary artefacts, i.e. how they provoke or invite users into perceiving practice, objects and acts in new ways. Furthermore, it is discussed if the interface is challenging users' expectations too much to provide them with the needed initial familiarity needed to begin the development of new acts with the interface. Subsequently, it is possible to discuss how the interface supports the development of users' practice with the interface. Ideally, it may be possible to consider to which extend the interface supplies openings for unanticipated use, e.g. through simplicity, ambiguity, flexibility, complexity, stability.

Dunne [17] criticizes electronic products for being based on a too narrow conception of the user as something that can be measured statistically, or in other ways can be framed by design. Instead he argues for a design practice that recognizes the user as a creative individual, which leads him to active aesthetic concepts of recognition and experience instead of the more passive concepts of (passive) perception and cognition. In literary theory there are well-established traditions for seeing the reader and the reading as active, creative and not just a passive receiver of the text (e.g. reader-response criticism), and Barthes [4] has developed this into a distinction between two kinds of texts, the readerly vs. the writerly text. The readerly text is smoothly composed with all things in their right place, while the writerly text through its plurality of meanings aims to make the reader a producer and not only a consumer of the text. This distinction has recently been applied to software as a distinction between programmable software like Unix/Open Source and mainstream proprietary software, where the user is addressed with a GUI and thus removed from the programming [14]. Even though the distinction should not be applied too rigidly (e.g.

as a distinction between the graphical interface and the code behind it, since precisely the graphical interface to a large extent has turned broad groups of users into being active, creative producers) it still points at an alternative way of conceptualizing the user, which helps explain what happens in the open source community or how certain computer game cultures develop (e.g. *Counterstrike*). Much software today seems to be designed as readerly to a more or less fixed concept of the user, and the ability to change superficial settings and configurations without really affecting the deeper levels is only a symptom of this.

In relation to Word, it seems clear that the different views and the possibilities to create auto-text and macros point toward the writerly. However, as argued above, the user has limited control over the typography and programming and the views are also limiting the user in the sense that they appear too hegemonic. In this sense, Word directs the creativity to only the content of the text, whereas for writers interested in the development of new forms, Word delimits the path to only a few parameters, such as typography, templates, etc. Various strategies for opening up the software architecture towards the writerly exist, one is open source, another plug-ins, a third open standards or release of game engines in the computer game business. This opening of the software architecture ranges from openings towards technically minded people (e.g. open source), to openings towards the general use culture and the experience of the individual user (e.g. open standards, flexible or modular software architecture). In Word the user is to a large extent a subject under the word-processor. In fact, one does not even write texts, but Word documents, a special file format that has become a de facto standard for word processing much to the handicap of other word processors.

DISCUSSION
In this paper, we have pointed to an emerging need in HCI for a theoretical and analytical reorientation beyond the current focus on cognition and the workplace. We have indicated how reorienting, as an aesthetic discipline is a possible answer to this need. Theoretically, it is motivated by the growing problems in the established approaches as well as by the rapidly expanding field of computer use, from desktop systems in a professional context to cultural interfaces, embedded interfaces, entertainment, household appliances, fine arts, etc.

Interface aesthetics, as we have outlined it, is both a theoretical and a practical commitment. The proposed reorientation provides new perspectives into specific interfaces and into the general interface culture and its history. The construction of the interface criticism guide, and the reported experiments with it, shows that interface aesthetics as a new discipline can deliver operational tools for practical design and assessment.

Our own analysis of Word together with the our students experiments using the interface criticism guide, serve to illustrate that it is indeed possible to use the guide fruitfully

in the assessment of ordinary, real life interfaces. We realize, however, that criticism is hard to perform completely without basic insights into aesthetics and critical traditions from fields like literature or liberal arts. Interface criticism is, consequently, not only a vehicle for introducing aesthetics into human-computer interaction, but it is also an invitation to the aesthetic disciplines to join us in our disciplinary transformation. Thereby, new perspectives of digital aesthetics and of the guide could be developed further. For example, the guide could come to address relations between aesthetics and use as well as the temporal dynamics of the interface. So far we have concentrated on discussing the interface as a representational structure, but insights from game studies and narration could be used to further discuss the temporal dimensions.

Because Word is a well-known computer artefact with a long history, it was likely that the criticism of it would mostly yield unsurprising banalities. However, it turned out that the criticism points to precarious limitations of the interface, e.g. the lacking support for creative, non-office writing; as well as possible directions for further development of the application beyond mere addition of features, e.g. the introduction of more explicit material metaphors. Generally, interface criticism seems to be a valuable counterpart to existing methods and techniques in HCI and interaction design, making it possible to address the cultural context and the dynamics of interaction in new and relevant ways.

It may be argued that interface criticism is a too subjectivist method. However, subjectivism is not a new problem generated by the introduction of aesthetics to HCI, it is a necessary consequence of the fact that users are competent, interpreting and co-creating active individuals. Aesthetic theory is based on aesthetic judgments and taste, but the subjective judgment is qualified and generalized through theory and through the critical discussions in a professional community. Consequently, it is far from pure subjectivity. Furthermore, for the field of HCI to be able to deal with aesthetic quality and the perceptions of independent individual users hermeneutics and value judgments cannot be avoided. Statements of measure or quantity are different from statements of value or quality. Aesthetics is a matter of quality.

Interface criticism addresses two levels of analysis, the level of a specific interface being developed, and the level of a general critical theoretical discourse that is similar to the role of art and literary criticism. In the context of a specific development project interface criticism is an instrument for formative assessment. In the context of the general discourse, interface criticism contributes to a heightened awareness concerning, e.g. representational issues and techniques in HCI. Good criticism should both identify some of the issues that are already important in HCI and further an awareness of these issues, thus leading to innovative design and design for innovative use. These two levels of analysis are not separated. Criticism in a concrete project may contribute to the general discourse, and the general discourse may be understood as a new loop of formative assessment in interaction design. Because almost no development projects today start from scratch, the general discourse provides insights into existing, competing or similar interfaces on the market, along with interfaces on the platform, which the new interface is being designed for. In this way, criticism on the border between concrete analysis and general critical discourse forms a basis for the designer to navigate the design space.

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