

Breaking Usability Rules to Enable Reflection

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ABSTRACT

We propose a different view on user interface design and argue that, when designing an interface to encourage reflection, usability rules should be intentionally broken. In our study one of the most influential lists of usability heuristics is evaluated and assessed for its applicability in the design of interfaces that emphasize reflection. We explore the impediments of these heuristics and rephrase some in a complementary or even contrary way that fits the design process of an interface that specifically encourages reflection.

Author Keywords

Interaction design; user interface design; reflective design; usability.

ACM Classification Keywords

H.5.3 Human-centered computing ~ Heuristic evaluations

INTRODUCTION

On first sight there is nothing unusual about the bicycle depicted in Figure 1. But for an unsuspecting cyclist trying to ride it, there is a surprise in store. When steering to the right the bicycle turns to the left and vice versa. It is an exceptional challenge to ride it; in fact it is nearly impossible. But the experience is intense and may induce new insights on cycling.

Whereas a normal bike can be operated without a need to think, this bike induces thought about a many things: about gravity, about balance, about how you stay upright on a normal bike in the first place. This example shows that making the familiar strange can evoke questions that otherwise would not be asked. Just a little modification can make something a challenge to operate but can encourage reflection. Encouraging reflection on a task, action or topic is the aim of reflective design, which includes the design of reflective user interfaces.

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Figure 1: The challenging bicycle. Rental bicycle from Gekke Fietsen (“Crazy Bikes”), Belgium. Designer and photographer unknown.

In our study we propose a different view on user interface design and argue that to encourage reflection. We argue that the rigid application of usability standards can be an impediment when designing interfaces that should encourage reflection. By reviewing common usability heuristics and analyzing their propensity to stimulate reflection, we derive and propose 7 design recommendations for reflective interfaces.

USABILITY

Interface design methods are often oriented towards efficient satisfaction of short-term goals. From this perspective the main purpose of an interface is to facilitate flawless interaction between man and machine [5]. A user interface that is designed according to optimal usability standards can be appropriate in accomplishing practical tasks that require a short-term, quick resolution.

Usability is considered to be a precondition for a fulfilling user experience, but by itself proved to be a too limited view on HCI design: the affective side of a user experience is not taken into account [1]. We argue that usability can also hold impediments for designing an interface that specifically encourages reflection.

REFLECTION

In their paper on designing for reflection Lars Hallnäs and Johan Redström introduce the term "slow technology", a design strategy for technology aimed at reflection and moments of mental rest rather than efficiency in performance [3]. They consider time to be an important factor in designing for reflection. When approaching design

from a usability perspective tools should be created that get the job done, quickly and efficiently. The span of time to get something done should be as short as possible. But time could also be perceived as something to dwell in, thereby encouraging reflection. Slowness in learning, understanding and presence gives people time to think and reflect. Hallnäs and Redström call this "time technology" that through its "slow" character emphasizes the presence of time and enables reflection.

They introduce slowness and time as key aspects of reflective designs. The absence of conscious time perception in usability-driven designs leaves fewer opportunities for reflection. Slowness opens up the user for a conscious perception of time that, in turn, enables reflection.

THE IMPEDIMENTS OF USABILITY

In this section we explore usability heuristics from a reflective perspective and rephrase some of them into design recommendations for reflective interfaces. Jakob

Nielsen's "10 Usability Heuristics for User Interface Design" [6, 7] are commonly recognized heuristics for user interface design. These heuristics, conceived in 1995 from a pure usability point of view on HCI, proved to be quite persistent. At present they are still quoted and used as a starting point for elaborating more extensive heuristic lists.

When discussing guidelines for any kind of interaction design it is unavoidable to address heuristics on usability. Every interaction designer would probably agree that usability clears the way for a more profound and complete user experience. But is this also the case if usability is considered from a reflective perspective? In this section Nielsen's influential lists of usability heuristics is evaluated and assessed for its applicability in the design of interfaces that should encourage reflection. We explore the impediments of usability and rephrasing some usability heuristics in a complementary or even contrary way that fits the design of an interface that makes you think.

In Table 1 we explore each of Nielsen's 10 usability heuristics [7] with respect to their reflective quality.

Nielsen's heuristics	Reflective quality
<p>Visibility of system status</p> <p>The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.</p>	<p>Rich feedback is an important feature of reflective interfaces [4, 10]. "Reasonable time" is probably meant to be "as quick as possible". In reflective interfaces slowness [3] and delay [4] are considered to be a key feature enabling reflection.</p>
<p>Match between system and the real world</p> <p>The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.</p>	<p>Although it is important not to alienate the user, reflective interfaces can deliberately distort the real world to create a different perspective [10]. Always following real-world conventions, in a way the user is accustomed to, can impede reflection because it does not allow different interpretations. Presenting real-world conventions in an unconventional context or seemingly illogical order raises questions and enables different interpretations [2, 8, 10].</p>
<p>User control and freedom</p> <p>Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.</p>	<p>A reflective interface allows user control over the meaning-making process [10]. But making mistakes can be a very fruitful source for creativity. Chance and making mistakes is closely related to freedom. Therefore user control and freedom should be interpreted as conditions that encourage reflection. It is impossible to make a mistake in a reflective process because any outcome is valid. The system should not correct the user in a constraining way.</p>
<p>Consistency and standards</p> <p>Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.</p>	<p>In reflective interfaces the users are explicitly encouraged to wonder about the information they get presented. Inconsistency and ambiguity can encourage people to rethink the meaning of information presented to them as long it does not obstruct the flow of interaction [10]. Rigidly following standard platform conventions can impede the reflective process. Presenting the user with new, unexpected options can shake up entrenched views and make users receptive to new perspectives.</p>
<p>Error prevention</p> <p>Even better than good error messages is a careful design that prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.</p>	<p>A system should work like it is programmed but intentional errors, designed to change the perspective of the user, can encourage reflection.</p>

<p>Recognition rather than recall Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.</p>	<p>Making an effort to recall something can intensify the learning-process and makes information easier to remember.¹ Figuring out a, not so obvious, interface can encourage reflection. But friction and indistinctness should not obstruct the interaction.</p>
<p>Flexibility and efficiency of use Accelerators unseen by the novice user may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.</p>	<p>A reflective interface should be flexible and adapt to the specific needs of a user. When efficiency is only intended to reduce the time span of an interaction to a minimum, it can also hinder reflection [3].</p>
<p>Aesthetic and minimalist design Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.</p>	<p>From a designers point of view irrelevancy should be avoided but the designer or system should in their turn never rigidly impose what is relevant for the user. Reflective design allows users to maintain control of and responsibility for the meaning-making process [10].</p>
<p>Help users recognize, diagnose, and recover from errors Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.</p>	<p>Utilize error messages to convey rich feedback on a user action. Suggesting a too confined solution may limit the space of possibilities that a user can explore to consider better options [4].</p>
<p>Help and documentation Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.</p>	<p>A reflective interface should be self-explaining. Extra documentation should be integrated in the interaction and make the reflective process more profound instead of just explaining it [10].</p>

Table 1: Nielsen's usability heuristics [7] (left column) and an analysis of their reflective qualities (right column).

After evaluating and assessing Nielsen's heuristics for their applicability in the design of reflective interfaces the following general similarities and differences can be defined.

A heuristic evaluation can be executed from a usability or reflective perspective.

Guidelines for reflective design should be developed beyond the preconditions of usability.

Unintentionally disregarding usability rules can lead to frustration. *Intentionally* breaking usability rules, causing friction, delay and deliberate slowness, can be a reflection-booster.

DISCUSSION

After a closer look, Nielsen's heuristics indeed prove to be a set of usability-orientated principles; they contain no direct applicable design principles that encourage reflection. Nonetheless, where not conflicting with the intended reflective features of an interface, they can be treated as

preconditions for reflective design: after all, a reflective interface may be usable.

Overall, however, Nielsen's heuristics proved to be too constraining instead of giving space to reflection. By establishing these impediments and rephrasing some of them in a complementary, sometimes contrary way the following recommendations for reflective design can be suggested:

Provide rich feedback to show the space of possibilities.

Use distortion of the real world to create a different perspective.

Use slowness and delay to enable reflection.

Never impose what is relevant for the user and allow users control over the process of meaning making.

Don't correct the user in a constraining way; making mistakes can be a fruitful source for creativity and learning.

Don't follow standard conventions but dare to present the user with new, unexpected options.

Recall to remember. Making an effort to recall something can intensify the learning-process and make information easier to remember.

¹ Making an effort to retrieve information from your memory is an efficient learning strategy. Tests enhance later retention more than additional study of the material. This phenomenon is known as the "testing effect" [9].

CONCLUSION

In our study we make a contribution to the field of designing interfaces that specifically encourage reflection. After conducting an explorative research on commonly accepted usability rules, we derived and propose 7 design recommendations. We realize that some of our argumentation in table 1 is based on our professional insight on interaction design and is yet not grounded in previous research. In future studies these assumptions and final recommendation, mentioned in the discussion, should be validated for their propensity to encourage reflection in the user.

We conclude that since reflective interfaces should be designed to *make you think*, they should be designed beyond the preconditions that are suggested by a pure usability orientated design. To be flawless and fast can be an obstacle to a profound reflective experience. Deliberate slowness and friction can encourage a user to make an extra effort and *make him think*.

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