Nielsen's Ten Heuristics

Objective :

•In this Lecture you will be introduced to another set of well known interface design guidelines proposed by Jacob Neilsen .

•Their application to specific situations like a web site will be discussed in the background of user centered Designing framework.

•The procedure of conducting a Heuristic Analysis will be delta with in the next lecture number 5.

Introduction

Jakob Nielsen* (working along with Molich in 1990) proposed a set of ten guidelines that can be used as Principles of Design for a new Interface.

These also can be used as Heuristics for evaluating an Interface.

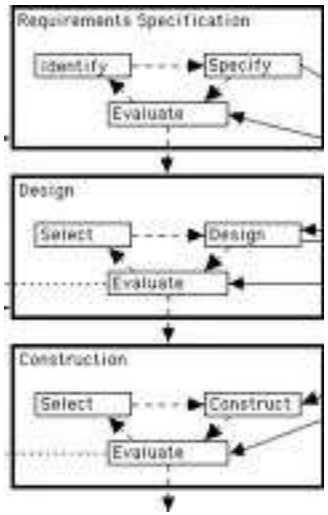
Since the ten guidelines were more in the spirit of rules of thumbs than specific rules, they are called as ‘ Heuristics’ rather than rules or laws that hold true in every case.

Jakob Nielsen

Usability consultant

Jakob Nielsen is a leading web usability consultant. He holds a Ph.D. in human–computer interaction from the Technical University of Denmark in Copenhagen.

He has authored many books in Usability, HCI, & Experience design. His book titled " Usability Engineering" 1993 is a textbook on methods to make interfaces easier to use.

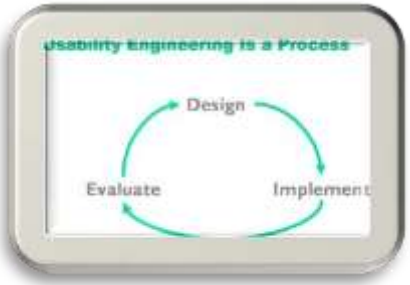


Usability Engineering

Usability Engineering involves

User Research; Design Research and Validation of Design through Construction & User Testing.

In some institutions it is taught as an independent discipline while in others it is part of HCI discipline.



Introduction

Heuristics means “rules of thumb”.

These ten ‘rules of the thumb’ were derived after careful research by Nielsen who after conducting a factor analysis of 249 usability problems, came up with ten simply stated guidelines in 1994.

Nielsen’s heuristics method are empirically based derivations. Widely used by Usability professionals (which includes Interface designers), they are a means of quickly identifying likely interface design problems in an application.

Method suggested by Nielsen is popular because of its simplicity and low cost. It is preferred evaluation technique at the preliminary design stages by HCI professional.

The Ten Heuristics as put forth by Nielsen.

1. **Visibility of system status**
2. **Match between system and the real world**
3. **User control and freedom**
4. **Consistency and standards**
5. **Error prevention**
6. **Recognition rather than recall**
7. **Flexibility and efficiency of use**
8. **Aesthetic and minimalist design**
9. **Help users recognize, diagnose, and recover from errors**
10. **Provision of Help and documentation**

Each principle is explained in consequent slides.

Visibility of system status

Users need to be kept informed by the system about what is going on, through appropriate feedback within reasonable time.

Elaboration: This means the user needs to be constantly made aware of his/her interaction with the interface while interacting. The control response ratio (input – output time) need to be as small as possible. Any interface needs to communicate that it is in a ready state to be operated upon – at the start of an interaction cycle.

For example :
A glowing LED / flashing element indicating that the interface is live .

An animated symbol that states that ‘saving’ act is going on…..

Most important to users is to know "Where am I?" and 'Where can I go next?" Internal reference is a must to feel in control.

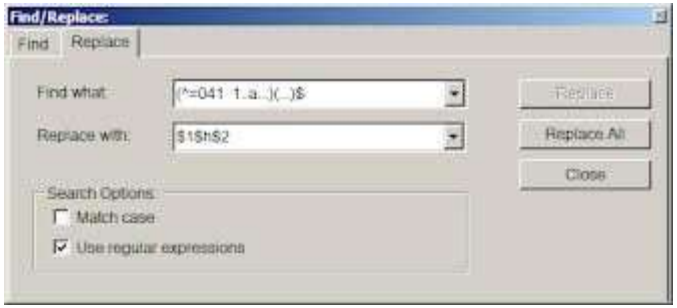
Match between system and the real world

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.

Elaboration: Technical jargon or using terms like ‘Initiate’ or ‘Load’ in pace of ‘ Start’ contributes to initial mismatch between the users cognitive process and machines feed back dialogue.

An interface need to allow smooth transition from contextual ‘reality’ world to artificial machine world. ….in other words from ‘ reality’ to ‘digitality’.

Tendency to use programming language and syntax on the display, while understandable to the software programmer, will certainly be a mismatch to a user.



Users can come from different backgrounds, skills levels , specializations & culture.
The context on the screen needs to match with the context of the user’s mental model

User control and freedom

Users often choose system functions which they did not want . (Mouse click due to haste) . This calls for Support undo and redo.
A user need to have to go through tracing too many steps back to regain control.

Elaboration: Sequential thought process in a user that follows a simple everyday human habit need to be reflected in the dialogue between the device and the user. A good interface facilitates this.

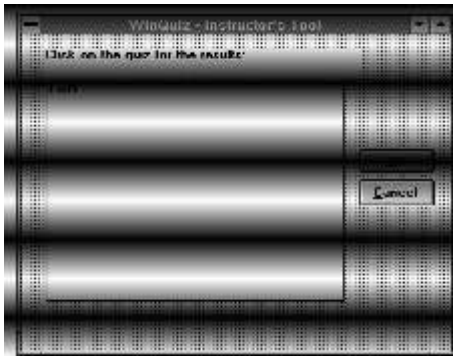
Being in control implies that one can choose to stop interacting an time rather than be forced or trapped by the interface into inaction.
Feeling in the user that he/she is in control at all times must be created.
If the user attempts to gain control and if a message like 404 error occurs the systems is unfriendly & unhelpful !

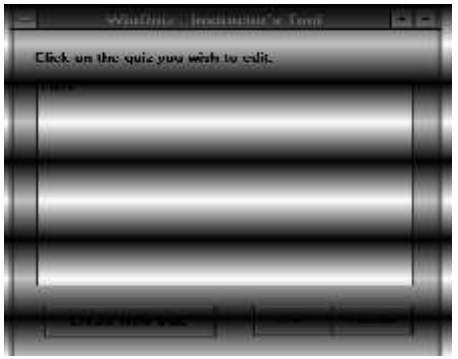
Can users select and sequence tasks? Can they easily re- turn to where they were if they choose an inappropriate /action path? The first example “accuses ‘ them of committing an error. The second one is much better but does not tell the user what to do next ! The third example is inappropriate !

Consistency and standards

Using different words to mean the same action or using different symbols on different pages can be confusing to the user. Users should not have to wonder whether different words, situations, or actions mean the same thing. They should not be in doubt as to what to do next.

Elaboration: Within an interface if multiple words or actions are used to mean the same thing , it only leads to confusion in the user due to perceived lack of consistency. Interaction pattern gets disrupted. When pattern becomes complex, user's cognitive load increases.
Consistency in dialogue as well as in visual elements is achieved by specifying and adhering to a dictionary of words / labels/ symbols/ colors which together form a 'standard' – a prescribed set – compulsorily to be followed.





Inconsistent wording & windows / buttons can confuse users when the destination page has a different title from the link. The two screens belong to the same software but appear differently at different places within the website.

Error prevention

By research it is possible to pinpoint the typical errors that users normally tend to commit. Prevention of error is best approach. However recovery from error prone actions through a well designed error message should be adopted.

Elaboration : To err is human. Errors can happen regardless the level of expertise of the user or familiarity of the interface. A good principle of design is to seek out error prone interactions , build in error prevention within the dialogue. Forewarning, restricting , prompting , retracing or recovery routes , etc are means of addressing errors. Errors lead to a situation wherein users feel subdued by a machine. Anticipating for errors and incorporating preventive measures ensures fear free and ego free user thereby giving importance to ‘H’ in HCI through ‘I’

GUI-style widgets cut down on the errors but may still have to be double checked before confirmation

Recognition rather than recall

Loading the STM- short term memory of the user beyond a limit has negative consequences. Given a navigation path, a user need not have to remember or recall all the instructions. Users are better at ***recognising*** *things they have previously experienced. Prompts , visibility , sequential direction, pop-ups etc should come to the aid of the user. Help needs to be easily retrievable.*

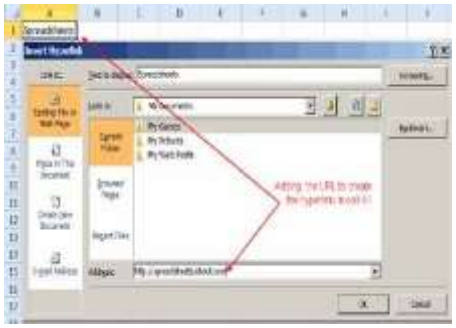
Elaboration : Reduction on cognitive load during the interaction ensures that the user is not asked to rely on means and methods that extract human cost. If an interface requires specilised training and use of memory to operate - it will be quickly abandoned by the user.
Analogy, metaphor, symbols, sounds, etc are used as design elements in an interface to ease recall thereby eliminating the need for ‘ thinking while interacting’ and memory loads for the user.

Good labels and descriptive links are crucial for recognition.
The first two icons are difficult to recognise or to recall. The third helps the user recognise where they are and recall which file is currently open.

Flexibility and efficiency of use

The system can cater to both inexperienced and experienced users. As the user becomes proficient - shortcuts can be encouraged. Thereby increasing the efficiency. Allowing the rearranging of the screen elements by the user can also be adopted.

Elaboration : Once a user becomes adept at using an interface , he/she upgrades into a higher level user from a novice. Such users will always seek to complete the task faster . Such users seek out shortcuts. An interface need to allow this. It needs to be flexible and make it possible for the user to adopt quicker dialogues through shortcuts. The user feels efficient as well as proficient. The feeling of having mastered the software is a flexible sign of being in control thereby.



Advanced users can opt for shortcuts in the spreadsheet example in the first picture.

Flexibility of keeping the required buttons / sections in view or hiding them gives the option to the user to rearrange GUI as needed as shown in the second picture.

Aesthetic and minimalist design

Relevancy, simplicity, minimum amount of labels, un cluttered graphics result in efficient communication dialogue between the user and the interface. All unnecessary superfluous elements need to be dropped.

Elaboration : Visual clutter in the interface only adds to inefficiency however impressive it is visually. Simplicity is equal to efficiency is equal to elegance is equal to beauty is the aesthetic algorithm in minimalism. Use of least number of elements (minimalism) is more ‘scientific’ rather than ‘artistic’. **Visual noise needs to be completely eliminated.**

Help users recognize, diagnose & recover from errors

Preventing a user who is about to make a error would be a good approach. Gentle wording of error messages, constructive suggestions, reeducating the user- all can contribute to a happy self confident user who is not afraid of being caught unawares or penalized.

Elaboration : No body likes to be loudly informed that he/ she has erred. Error messages need to be disused as suggestions / prompts and precise instructions so as to be able to correct the error and recover. The learning component in errors so that the user recognizes the error as it is being made, or recognizes the reason why the error happened in the first place – helps the user learn.

There is no way to understand the consequences of canceling. The onus seems to be on the user who will be held responsible for what ever is opted for. proper diagnosis & how to possibly recover is not clear. Very unfriendly interface./

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. Help quarries need to be answered promptly without the user having to go through an elaborate eliminating list.

Elaboration : This again is to assist the user *learn* and understand the dialogue between the user and the machine or understand - where what went wrong - or aid recall during memory-lapses due to long usage time gaps. Adequate 'Help' support system when the user wants and at the point where the user wants it - is a good principle of Interface design.

The screen shots (1&2) attempt to Train the user by o09ffering information on the consequences of their decision

Conclusions:

- These ten heuristics of usability help in refining a potential design into a good design. They ensure that interfaces evolve in the right direction.
- These rules of the thumb act a check list to evaluate a design.
- They also can be used as check list while evaluating any GUI.