



## 5 Key User Interface Principles

School of Computer Science | Software Analysis & Design

Marta Kristín Lárusdóttir, Associate professor

9. September, 2019



[www.hr.is](http://www.hr.is)

## Summary

- 5 Key design principles from chapter 1
  1. Visibility
  2. Feedback
  3. Constraints
  4. Consistency
  5. Affordance
- Other guidelines

- Reading
  - ID Cp. 1.7.3 (26 – 32);



[www.hr.is](http://www.hr.is)



## Design principles

- Generalizable abstractions for thinking about different aspects of design
- The do's and don'ts of interaction design
- What to provide and what not to provide at the interface
- Derived from a mix of theory-based knowledge, experience and common-sense



## 1. Visibility

### The principle:

A control should be visible so users know it is available

A Users should be able to initiate an action and can see what they can do

- WYSIWYG
- (W)hat (Y)ou (S)ee (I)s (W)hat (Y)ou (G)et



www.hr.is

## Visibility Principle Example

*A control should be visible so users know it is available*



- The users can see what they can do
- Some users go through the whole interface to see what is available for them



- A part of the visibility principle is making the functions that are not available gray and this relates to the constraints principle



www.hr.is

## 2. Feedback

Sending information back to the user about what has been done and what has been accomplished

Allowing the person to continue with the activity

Feedback includes:

audio, tactile, verbal, visual and combination of these



[www.hr.is](http://www.hr.is)

## Offer informative feedback

- For every user action, there should be an interface feedback.
  - For frequent and minor actions, the response can be modest, whereas for infrequent and major actions, the response should be more substantial.
- Visual presentation of the objects of interest provides a convenient environment for showing changes explicitly



[www.hr.is](http://www.hr.is)

## Offer Informative Feedback

- Obvious that the control has been used

We have several ways:

- a) We get a message
- b) What we asked for happens
- c) The control changes
- d) We hear a sound when the control has been used
- e) A process starts like looking up information

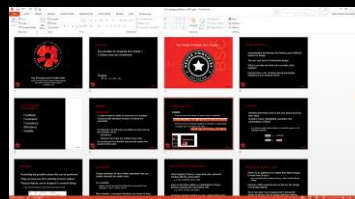
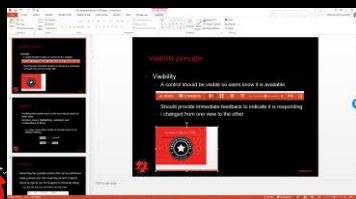


www.hr.is

## Feedback Example

A control should provide immediate feedback to indicate it is responding

- I changed from one view to the other by clicking the icon
- the change is shown and the whole view changes



www.hr.is

## Another Example

- When a button is clicked on it can provide sound or red highlight feedback:

Previous → "ccclchhk"

Previous → Previous

- Messages to users is one form of feedback in verbal form



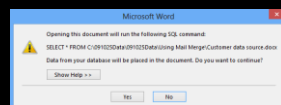
www.hr.is

## Messages to users

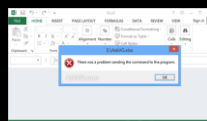
- Information



- Warnings



- Error messages



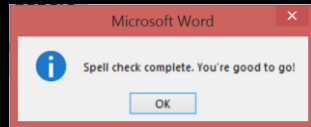
Are similar in windows systems and web solutions  
Look at examples from windows design



www.hr.is

## Message windows

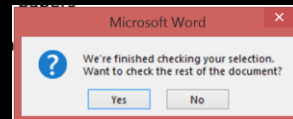
- Message windows



- Icon
- Only OK closing button
- Information text

- Yes/no questions

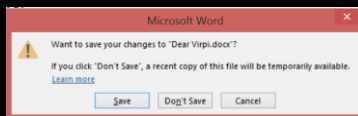
- Very similar
- Another icon
- Yes/no buttons



www.hr.is

## Message windows

- Warnings



- Warns the user about an unusual situation
  - What do you want to do?
- The user decides what to do
- Has often three alternatives
  - Yes, No, Cancel

- Errors



- Informing
  - Reports an error
- Constructive
  - The text should explain an alternative to recover
- Apologetic
  - The user needs assistance
  - The user is NOT stupid



www.hr.is

## Information, Warning, error message

**Innskráning**

Auðkennisnúmer hefur verið sent í SMS. Athugið að það getur tekið nokkrar mínútur að berast.

Notaðu auðkenni þitt til að skrá þig inn. Hvert auðkennisnúmer er einungis hægt að nota einu sinni.

Auðkennisnúmer:

Tengjast

**Innskráning**

Auðkenni / SMS Rafnæn skilríki

Notandanafn ekki rétt slegið inn

Notandanafn:

Lykillorb:

Tengjast

**Innskráning**

Notandi ekki til eða rangt lykilorð

Notandanafn:

Lykillorb:

Flýtleið:

Tengjast

Vandamál við innskráningu? Innskráningu með rafrænum skilríkum

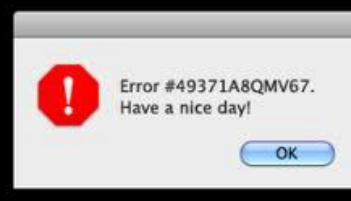
Greitt í Netbanka Íslandsbanka þann 07.09.2019

Kort fannst ekki

www.hr.is

## Text of messages

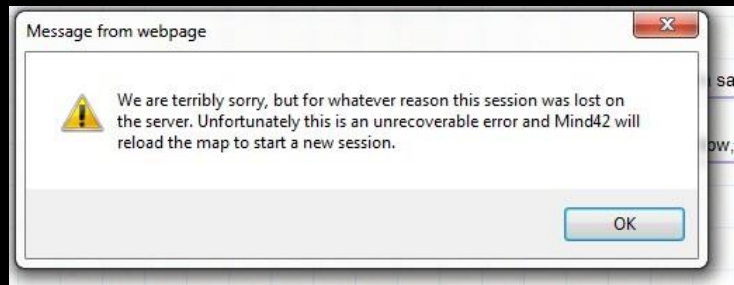
- Both for
  - Users
  - And for maintenance
    - Not always good
- Error codes should not be included in error messages
  - “Error 11: You are too impatient”
    - Came when a user in a web bank pushed the mouse button fast twice!



www.hr.is

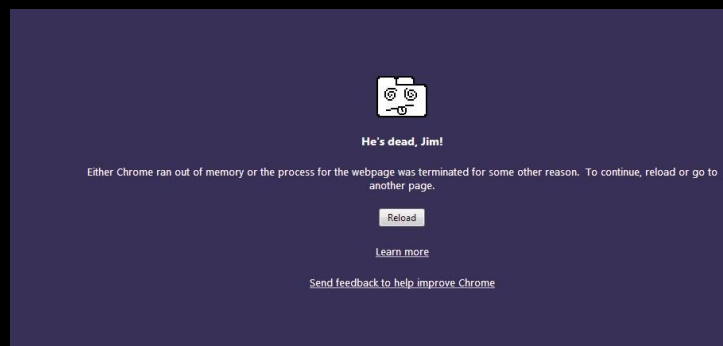


## Friendly message



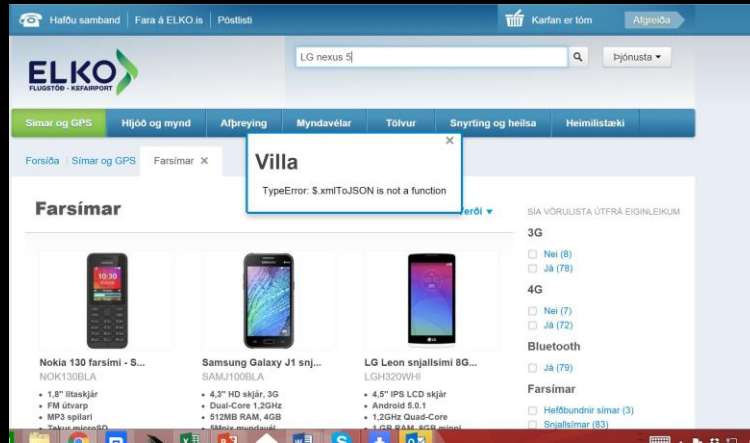
[www.hr.is](http://www.hr.is)

## Trying to be funny



[www.hr.is](http://www.hr.is)

## Bad message



www.hr.is

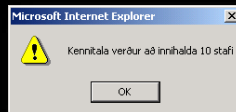
## Speak the users language



www.hr.is

## Some examples - Warnings

- Inserted 6 letters
- Did not insert the bank account



The same for all  
the input fields  
Too general!



www.hr.is

## This is better



www.hr.is

## Text of Warning



www.hr.is

## Warnings

- The goal is to warn the user about something that is not possible to undo
  - Disturb the user from their work
  - Sometimes not usable – better to have “undo”
  - Could be used when the Use case supports the warning
    - When the state of the system is that way that no option is natural
- We should ask ourselves
  - What information is important?
  - How displayed to minimize errors?



www.hr.is

## Error messages should be:

- Precise
  - Define exactly what is wrong
- Constructive
  - Give instructions on how to solve the problems
- Apologetic
  - Should be polite to the user

The screenshot shows the Gitargrip.is website. At the top, there's a navigation bar with links like 'Lágin', 'Listamein', 'Sönghæskurnar', 'Þískalstínn', and 'Toppílistarnir'. Below this is a search bar with the placeholder text 'Nafn lags, höfundar eða brot úr texta...'. A red banner across the middle contains the text 'Þú ert hér:' followed by a list of links: 'Hjálp', 'Senda inn lag', 'Skrá öskalag', and 'Uppáhaldslög'. To the right of these links is a form with a label 'Notandanafn' and a text input field. Below the input field is a button labeled 'Skráning'. A red error message is displayed above the input field, but the text is not clearly legible.

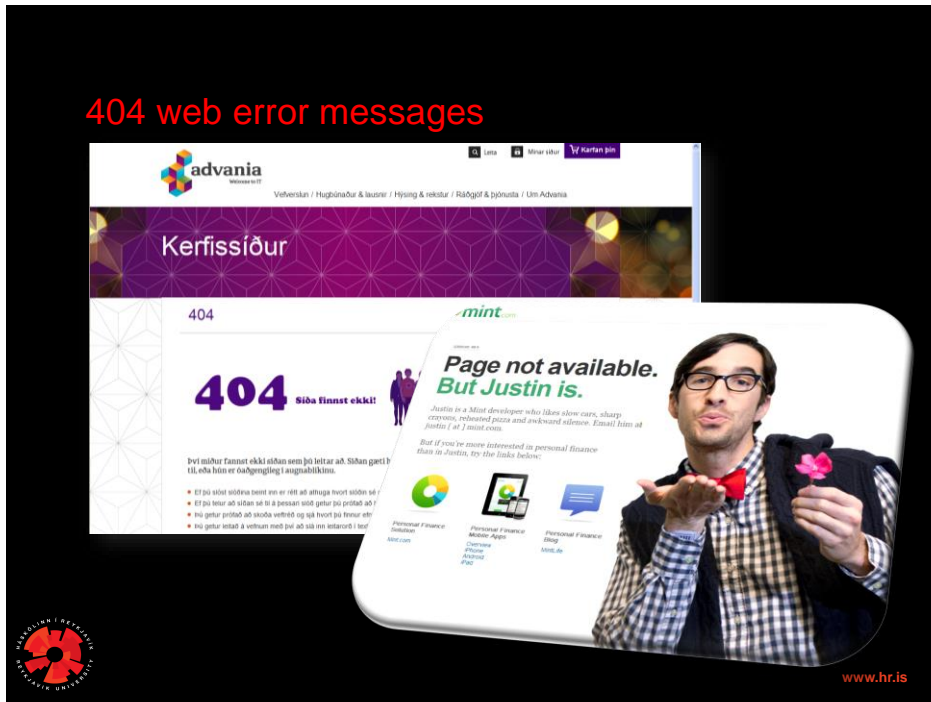
www.hr.is

## Good Error message

The screenshot shows a course registration form. The form has several sections: 'City / Town / Locality' (Reykjavik), 'State / Province / Region' (Other), 'ZIP / Post Code' (101), 'Country' (Iceland), and 'Phone Number' (+354 893 9868). Below these is a section titled 'Course' with fields for 'Course Title' (Research methods in HCI), 'Start Date' (15.08.2012), 'Date when course texts are decided' (mm/dd/yyyy), 'Number of Students', and 'Institution Course Code'. A red error message is displayed next to the 'Start Date' field, stating: 'Please format the date properly (07/23/2009)'. The form is well-structured and easy to use.

www.hr.is

## 404 web error messages



## Does not tell me much!!

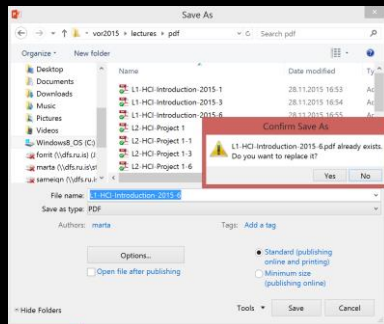
- Reykjavik.is



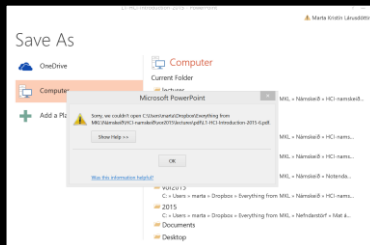
- Foxit Reader



## An unaccurate error message



If the pdf file is open  
you get this message:



[www.hr.is](http://www.hr.is)

## 3. Constraints

Restricting the possible actions that  
can be performed

Helps prevent user from selecting  
incorrect options



[www.hr.is](http://www.hr.is)

## Constraints examples

- Often done by „graying“ out fields



- Format the insert fields
  - E.g. not able to insert letter in an input field for numbers
  - Or select from a calendar field

- Pick from a drop down list



www.hr.is



www.hr.is



## 4. Consistency

Designing interfaces to have similar operations and use similar elements for similar tasks

Main benefit is consistent interfaces are easier to learn and use



[www.hr.is](http://www.hr.is)

## Strive for consistency

- Consistent sequences of actions should be required in similar situations;
- identical terminology should be used in prompts, menus, and help screens;
- consistent color, layout, capitalization, fonts, and so on, should be employed throughout.
- Exceptions, such as required confirmation of the delete command or no echoing of passwords, should be comprehensible and limited in number



[www.hr.is](http://www.hr.is)

## Internal and external consistency

- Internal consistency refers to designing operations to behave the same within an application
  - Difficult to achieve with complex interfaces
- External consistency refers to designing operations, interfaces, etc., to be the same across applications and devices
  - Very rarely the case, based on different designer's preference



www.hr.is

## Not consistent



www.hr.is

## Not consent

HÁSKÓLINN Í REYKJAVÍK  
REYKJAVÍK UNIVERSITY

**Innranet**

Marta Kristín Lárusdóttir  
Tölvunáfræðileid  
18.12.2003 09:21:12  
Tengdur notendur eru 12  
Copyright © 1997-2003  
Reykjavík University

Sími: 510 6200  
hr.is

**Gamli vefurinn**

Nýtt efni  
Námskeiðin  
Stundataflan

Skólinn  
Deildarstjóri  
Öl námskeið  
Aðilar skólans  
Þjóðsá

Gagnin mín  
Persónuuppl.  
Tölvuþöstur...  
Einkaréttir  
Vefsvæðið  
Vefurinn

Kerfisstýringar  
Kennsluférfi

Aðstoð  
Hjálp  
Handbók

**Stundaskrá**

Hotendamála... Vismótshönnu...

**T-515-NOTN**  
Notendamála hugbúnaðargerð

Kennarar  
Jan Gulliksen Aðalkennari  
Lars Oestreich Stundakennari  
Bengt Göransson Stundakennari

Stofna

Tími	Viðfangsefni	Stofa	Fyrirf.	Kennari	Breyta	Eyða
<input type="checkbox"/> Loka liðum tímum						
<b>Vika 1</b>						
22.10.2003 11:11	Tues: 2/12		J			✗
2 hours User centred systems design in an historical perspective						
<b>Vika 2</b>						
22.10.2003 11:11	Mon: 8/12		J			✗
3 hour lecture: Task modelling - Articles Assignment: Enhancing the task analysis from previous day						
22.10.2003 11:11	Tue: 9/12		J			✗
3 hour lecture: Usability evaluation - Articles Seminar: Group discussion on evaluation criteria.						
<b>Vika 3</b>						
22.10.2003 11:11	Wed: 10/12		J			✗
Bengt Göransson Theme of the third week is: Usability Design - UCSD as a design process Chapters 6, 7, 8 and parts of 9 from Gulliksen & Göransson. Extra literature is one chapter from Alan Cooper's: The Inmates are running the asylum! Why high-t						

**Þín Námskeið**

Tilkyrningar  
Markmið  
Lýsing  
Kennsluáæðir  
Námsmat  
Kennsluáæðun  
Stundaskrá

**Nemendur**

Ífrag  
Hópar  
Einkunnir  
Virkni  
Senda póst

**Kennsluférfi**

Beskr  
Fyrirlestrar  
Verkefni  
Umráðsbræðir  
Annað efni

**Hemendastj**

Prenta síðu

www.hr.is

## Not consent

HÁSKÓLINN Í REYKJAVÍK  
REYKJAVÍK UNIVERSITY

**Innranet**

Marta Kristín Lárusdóttir  
Tölvunáfræðileid  
18.12.2003 09:21:12  
Tengdur notendur eru 12  
Copyright © 1997-2003  
Reykjavík University

Sími: 510 6200  
hr.is

**Gamli vefurinn**

Nýtt efni  
Námskeiðin  
Stundataflan

Skólinn  
Deildarstjóri  
Öl námskeið  
Aðilar skólans  
Þjóðsá

Gagnin mín  
Persónuuppl.  
Tölvuþöstur...  
Einkaréttir  
Vefsvæðið  
Vefurinn

Kerfisstýringar  
Kennsluférfi

Aðstoð  
Hjálp  
Handbók

**Fyrirlestar**

Hotendamála... Vismótshönnu...

Sérstakinn vefur

Dagsetning	Tíðil	Glaumur 3/síðu	6/síðu	Hljóðg.	Annað	Breyta	Eyða
Öttilgreindur Lecture 1		✓			✓		
Öttilgreindur Lecture 2		✓					
Öttilgreindur Lecture 3		✓					
Öttilgreindur SAMT-talk		✓					
Öttilgreindur Lecture 4		✓					
Öttilgreindur Usability Requirements		✓					
Öttilgreindur User modelling		✓					
Öttilgreindur Task Analysis HTA		✓					
Öttilgreindur Task Patterns		✓					
Öttilgreindur Usability Evaluation		✓					
Öttilgreindur Scenarios		✓					
Öttilgreindur Bengts introduction		✓					
Öttilgreindur Usability Design -- The P		✓					
Öttilgreindur An Interaction Design Cas		✓					
Öttilgreindur UCSD and commercial proc		✓					
Öttilgreindur Design examples		✓					

Hressa Virkja

Háskólinn í Reykjavík • Öfandi 2 • IS -103 Reykjavík • Sími/Tel: +354 510 6200 • Fax: +354 510 6201 • © 1998 - 2003

www.hr.is

This was chosen

**HÁSKÓLINN Í REYKJAVÍK**  
REYKJAVÍK UNIVERSITY

Marta Kristín Lárusdóttir  
Tölvunáfræðileið  
28. janúar 2008 - 15:11:16  
Alls tengdir notendur: 1224

**Mitt efni**  
Forsíða  
Nýja efni  
Námskeið  
Stök námskeið  
Klúðar  
Stundatafla  
Kennsluférl  
Skilaboð

**Fyrirlestrar** í T-104-VIDM, Váðmóðshónnun, 2007-1

Váðmóðshónnun TD...

Raða efni: Flokkar | Dagsstíðir | Kennslufundir | Heiti

[Gona allt efni] | [Loka öllu efni]

T	Birt Daga	Heiti	Gætur	3/4/5	6/7/8	Hjól	Annab	Breyta	Eyða
✓	08.01.2007 16:41	V1 Kyning námskeiða							
✓	08.01.2007 16:42	V1 Kyning notendna hónnun							
✓	16.01.2007 10:46	V2 Notendur							
✓	16.01.2007 10:46	V2 Upplýsingaþöfn							
✓	23.01.2007 10:20	V3 Verkefni							
✓	23.01.2007 11:49	V3 Umhverfi og fæmi							
✓	30.01.2007 12:07	V4 Væðing námskeiða							
✓	30.01.2007 12:08	V4 Lögfræði og hónnun							
✓	09.02.2007 14:59	V6 Gerð þessara frumgerðar							
✓	09.02.2007 15:12	V6 Þrátt þessara frumgerðar							
✓	20.02.2007 09:07	V7 Samkvæmtar							
✓	20.02.2007 12:13	V7 Hónnun							
✓	21.02.2007 13:59	V7 Upplýsinga f. hónnun							

**Um námskeiðið**  
Forsíða  
Tölvunáfræðileið  
Námskeið  
Lýsing  
Kennsluférl  
Námsmat  
Kennsluférlun  
Stundaskrá

**Nemendur**  
Nemendatal  
Væðing  
Hónnun  
Einkunnir  
Væðing  
Senda póst

**Kennsluférl**  
Bækur  
Væðing  
Þrátt  
Spurningar  
Umfræðing  
Fyrirlestrar  
Annab efni

www.hr.is

To much consistency

**Vefverslun Símans**

SÍMINN

Nýjar vörur  
Símtækir  
ISDN búnaður  
GSM símar  
NMT símar  
Númerahíttar  
Þaxtækir

Leit:  
[Innkaupakarfa]

Innkaupakarfa

Þú ert með 1 vöru í innkaupakörfunni:

Til að breyta fjölda eininga skaltu breyta magni og smella "Upfæra körfu".

Kaup | Versla með | Taka körfu | Upfæra körfu

Heiti	Lýsing	Einingav.	Væð dagsins	Magn	Annar afsl.	Heildarvæð
Beocom 1400 Rauður		6.490	6.490	2	0	12.980
<b>Samtals:</b>						12.980

SÍMINN INTERNET

Forsíða  
Háttaleit  
Innkaupakarfa

Þrátt  
Hónnun  
Senda póst

www.hr.is

## Not consistent

The screenshots illustrate inconsistencies in the SKISTAR.COM website's user interface. The top navigation bar is consistent across all pages, but the content and form elements vary significantly. For example, the 'Skipass' section (top-left) and the 'Skidhyra' section (top-right) both feature a 'NÄSTA' button, but the surrounding text and form fields are different. The bottom-left screenshot shows a 'BOKA ONLINE' section with a 'NÄSTA' button, while the bottom-right screenshot shows a 'Skidhyra' section with a 'NÄSTA' button. The website's design is not uniform, leading to a lack of consistency in the user experience.

www.hr.is

## When consistency breaks down

- What happens if there is more than one command starting with the same letter?
  - e.g. save, spelling, select, style
- Have to find other initials or combinations of keys, thereby breaking the consistency rule
  - e.g. ctrl+S, ctrl+Sp, ctrl+shift+L
- Increases learning burden on user, making them more prone to errors

www.hr.is

## 5. Affordance

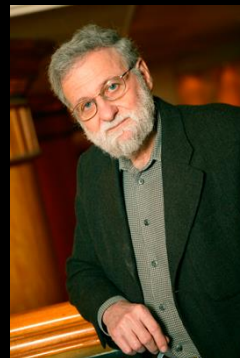
Refers to an attribute of an object that allows people to know how to use it



[www.hr.is](http://www.hr.is)

### Affordances: to give a clue

- Virtual affordance
  - e.g. a mouse button invites pushing, a door handle affords pulling
- Norman (1988) used the term to discuss the design of everyday objects
- Since has been much popularised in interaction design to discuss how to design interface objects
  - e.g. scrollbars to afford moving up and down, icons to afford clicking on

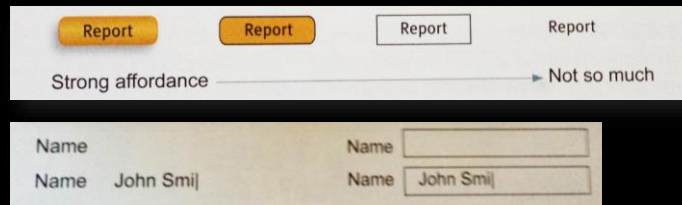


[www.hr.is](http://www.hr.is)

## Affordance principles

- Affordance

- The appearance of any control should suggest its functionality
- A button should afford clicking, a scroll bar should afford scrolling, items in a list should afford selecting, a play button should afford play



www.hr.is

## Eight Golden Rules from Ben Sheiderman

1. Strive for Consistency
2. Cater for Universal Usability
3. Offer Informative Feedback
4. Design Dialogs to Yield Closure
5. Prevent Errors
6. Permit Easy Reversal of Actions
7. Support Internal Locus of Control
8. Reduce Short-Term Memory Load



www.hr.is

## Jakob Nielsen's Guidelines from 2014

1. Visibility of system status
2. Match between system and 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, recover from errors
10. Help and documentation



- More explanation: <http://youtu.be/hWc0Fd2AS3s>



[www.hr.is](http://www.hr.is)

## Summary

- 5 Key design principles from chapter 1
  1. Visibility
  2. Feedback
  3. Constraints
  4. Consistency
  5. Affordance
- Other guidelines
- Reading
  - ID Cp. 1.7.3 (26 – 32);



[www.hr.is](http://www.hr.is)