Human Computer Interaction CS449 – CS549

Week 3-1

What is a good user interface
Guidelines, Styles, and Evidence

KÜRŞAT ÇAĞILTAY

Today – Foundational Concepts

- Guidelines – Principles – Theories
- Experiments on Interface Designs

Before start, first assignment

Please report your findings under the titles given below:

1. Introduction and Association with the Literature (3pts)

- Describe the task that you want to accomplish with the interactive application.
- Problem Definition – What is/are the design/usability problem(s) that you face when trying to accomplish your task? Associate the problem according to the readings. Why is it an HCI problem? Explain Clearly.
- Add screenshots or drawings to show the details of the problem(s)

2. Recommendations, Proposed Solution (3 pts)

How to eliminate the problem? Explain why your proposed solution is better than the original one. Associate the solution according to the readings.

Use **Figma prototyping tool** and propose the improved version – The proposed version doesn't have to look professional, just try to get the better design in your mind across.

Publish and share your solution with Figma link in your report.

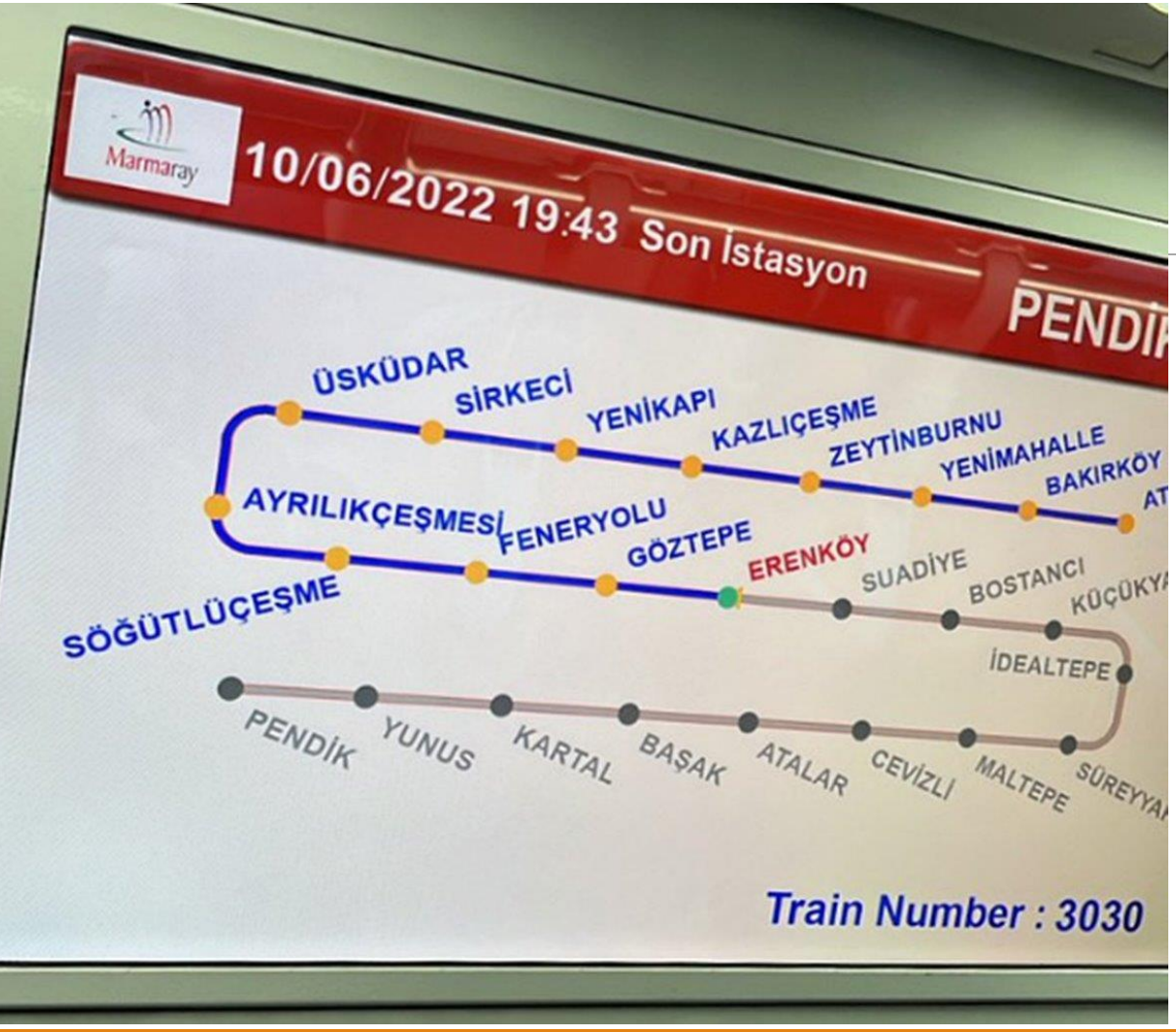
3. References (1 pt)

Use APA style for your references (both in the body and References section)

Reminder - TA Info

- Vahid Khalili Param,
- vahid.khalili@sabanciuniv.edu
- Office hours: Wed 10:00-12:00
- FENS L068

Design Problem of Marmaray Stops



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- Sr. Product Designer @CommunityGaming
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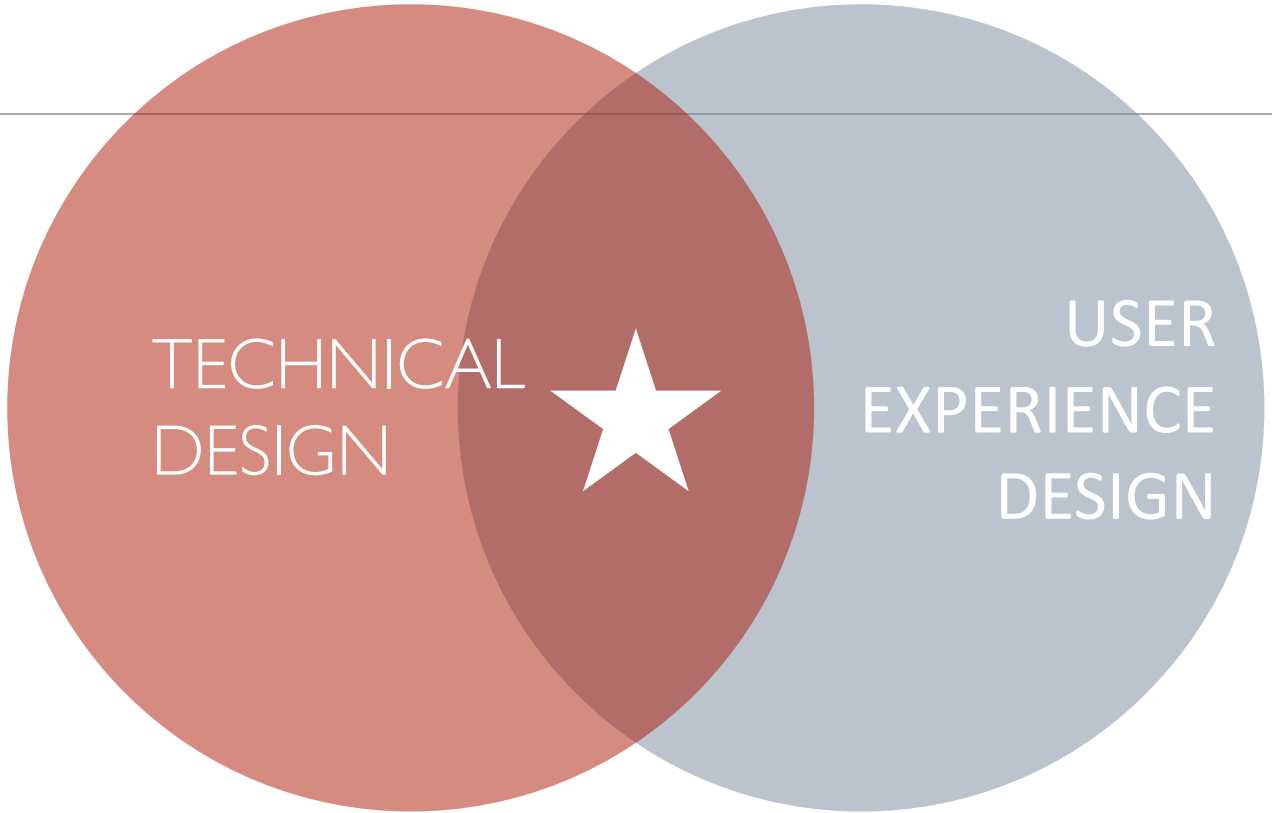
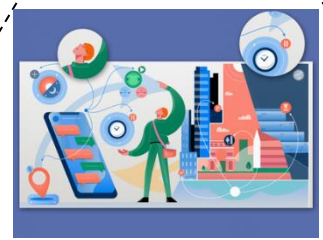
Marmaray'daki durak karmaşasından bunalan genç, bilgisayarda tasarladığı yeni durak sistemini internete yükledi. Ulaştırma Bakanlığı'na seslenip "Teşekküre gerek yok" ifadelerini kullandı.


TECHNICAL
DESIGN
USER
EXPERIENCE
DESIGN

Four Principle components of an HCI System

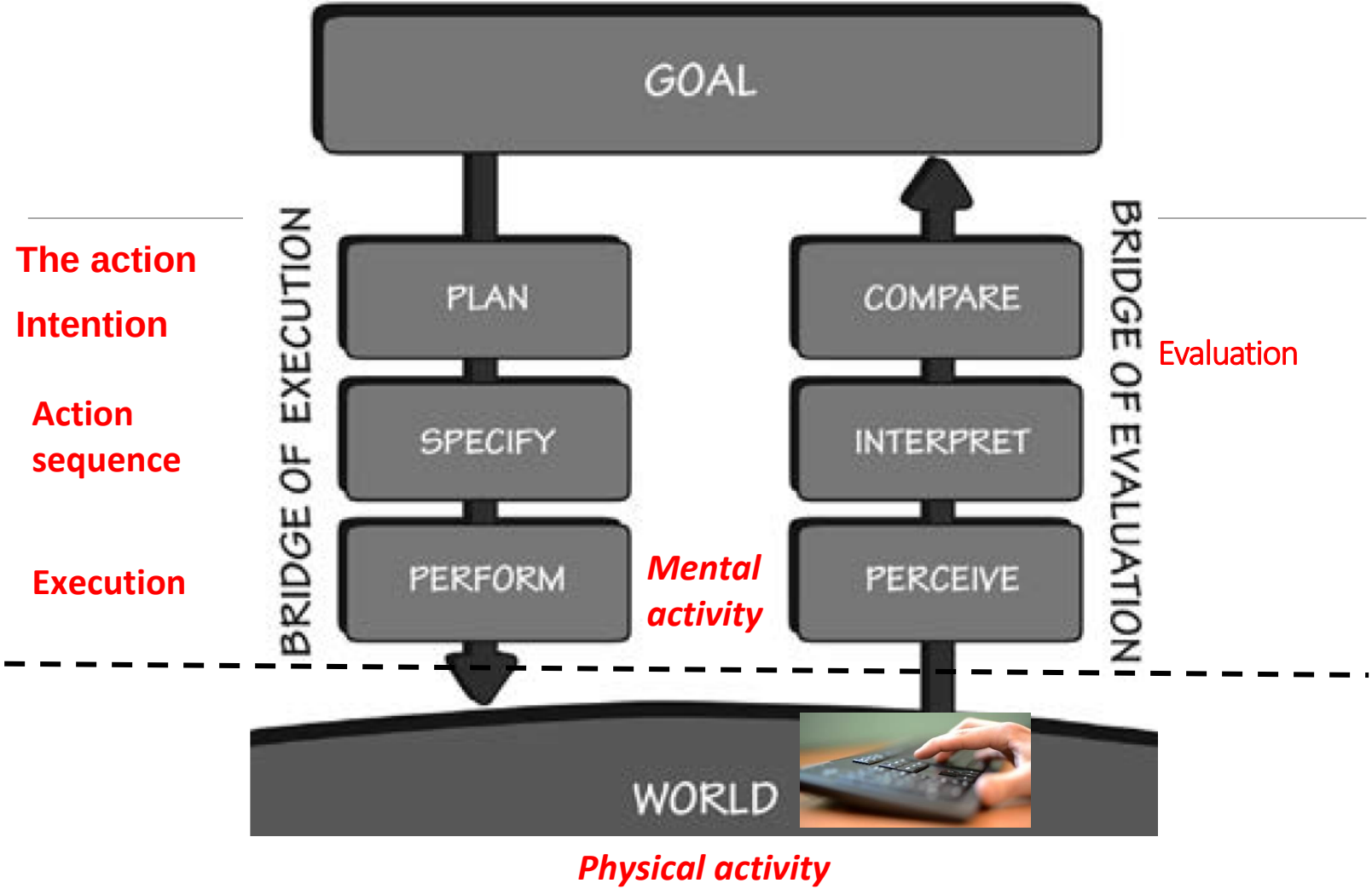
Tool

In Context



User

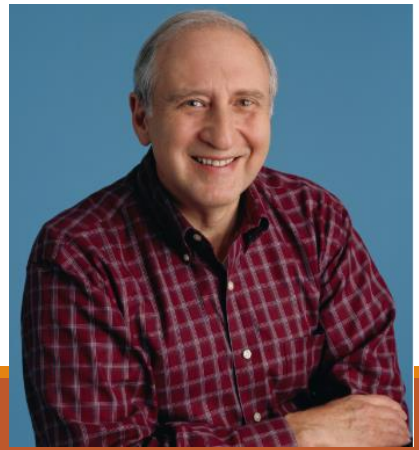
Task/Goal



Seven stages of user activities involved in task performance

Shneiderman's Eight Golden Rules of Interface Design

1. Strive for consistency. ...
2. Seek universal usability. ...
3. Offer informative feedback. ...
4. Design dialogs to yield closure. ...
5. Prevent errors. ...
6. Permit easy reversal of actions. ...
7. Keep users in control. ...
8. Reduce short-term memory load.



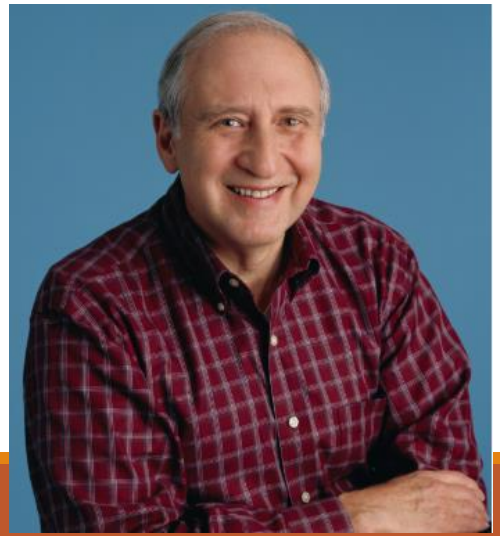
Norman's Principles of Good Design

1. **Discoverability** - State and action alternatives should be **Visible**
2. A **good conceptual model** with a consistent system image
3. **Good mappings** for the relationship between stages
4. Continuous **Feedback**
5. **Affordances –** possible interactions between people and the environment
6. **Signifiers –** what actions are possible and how
7. **Constraints -** physical, logical, semantic, and cultural

Usability of interactive systems:

Ben Shneiderman. Ch-3 Guidelines, Principles, Theories

1. Style Guidelines,
   - Low-level focused advice about good practices
2. Principles,
   - Middle-level strategies or rules to analyze and compare design alternatives
3. Theories
   - High-level widely applicable frameworks



1- Style Guidelines

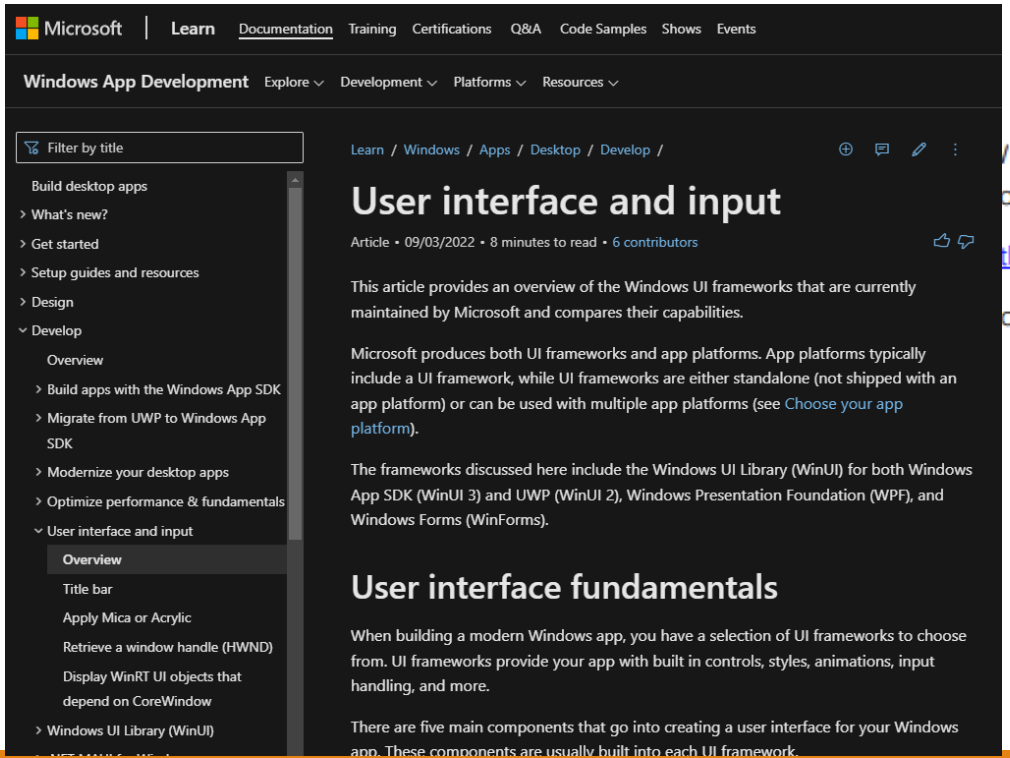
- Guidelines : Low-level focused advice about good practices
  - best practices derived from practical experience or
  - empirical studies, with appropriate examples and counter examples

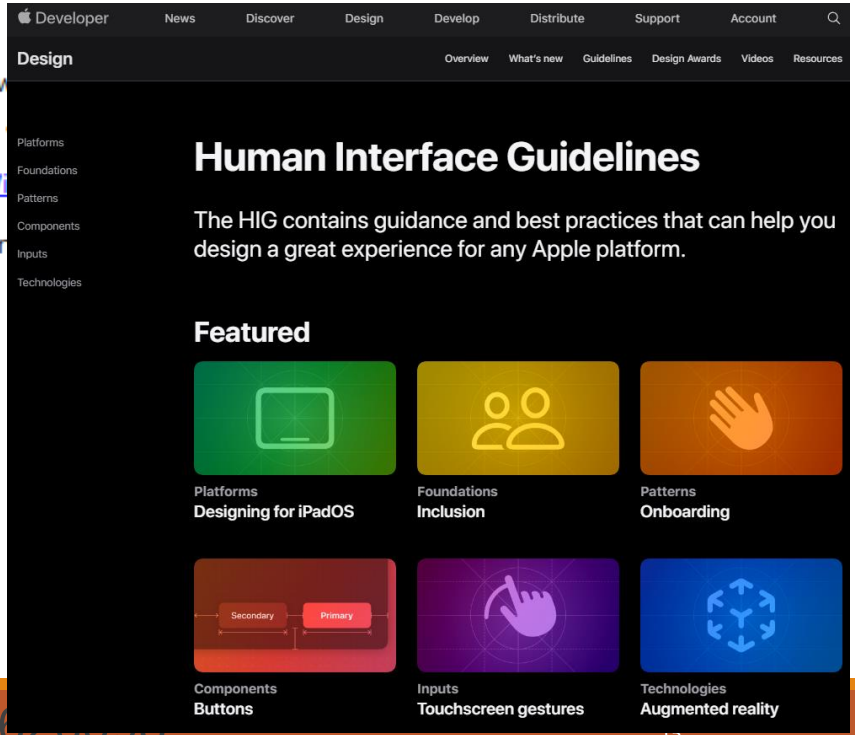
  - ☹ guidelines can be too specific, incomplete, hard to apply, and sometimes wrong

Guidelines

Windows 10

User experience guidelines for Universal Windows Platform (UWP) apps

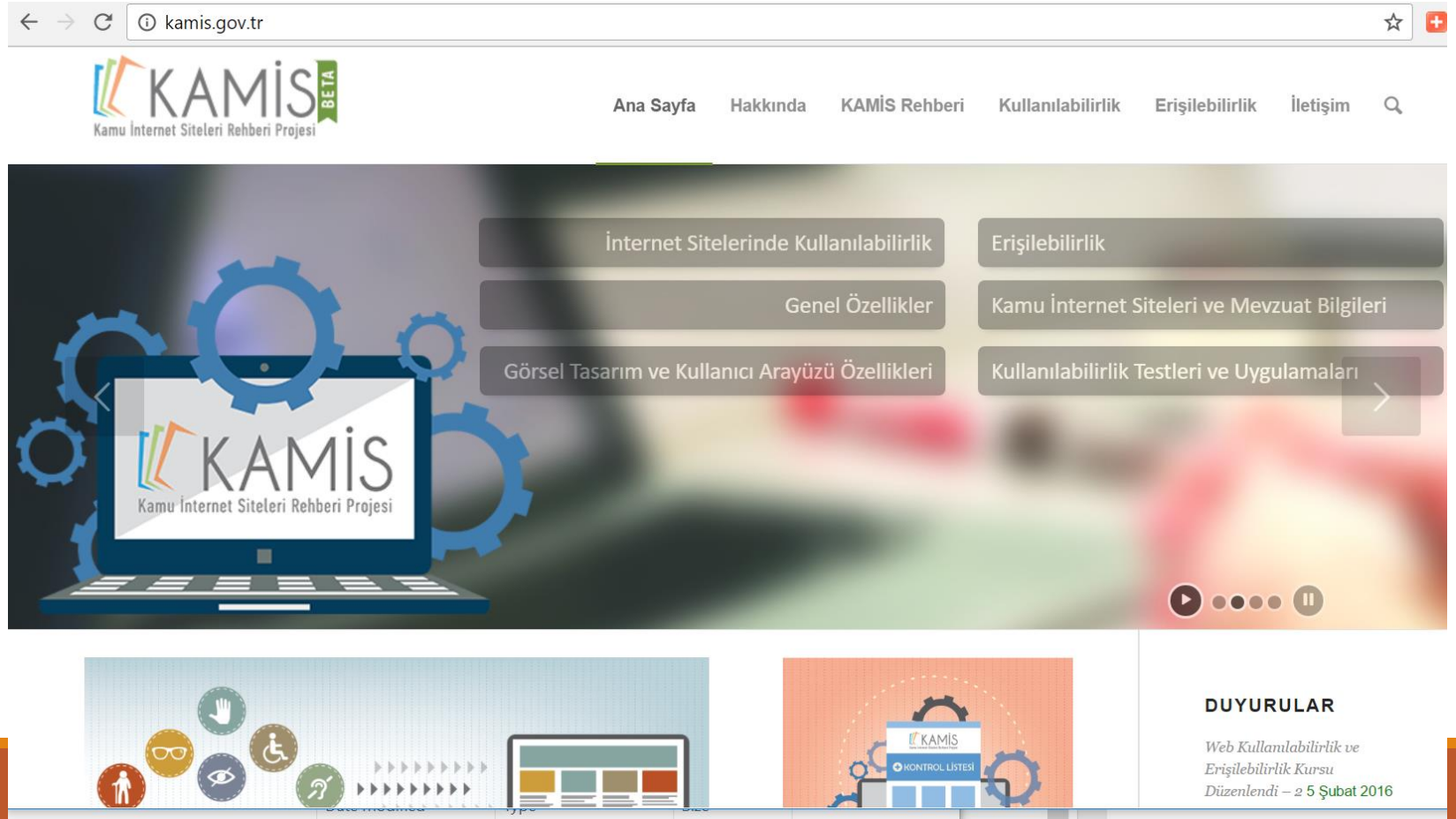




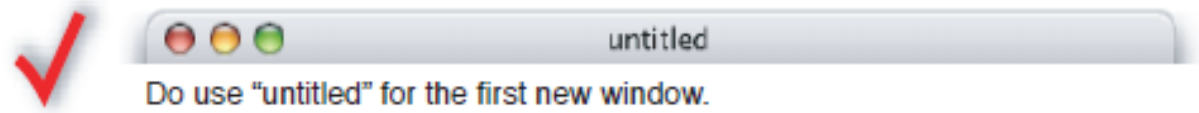
- https://go.microsoft.com/fwlink/p/?LinkId=

US Government

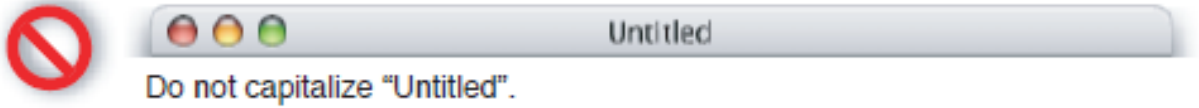
Turkish Guidelines by TÜBİTAK KAMİS kamis.gov.tr



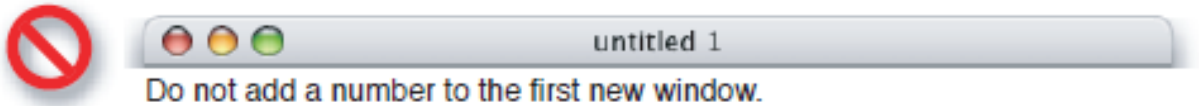
Apple guidelines



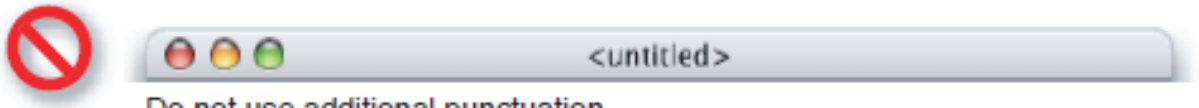
Do use “untitled” for the first new window.



Do not capitalize “Untitled”.



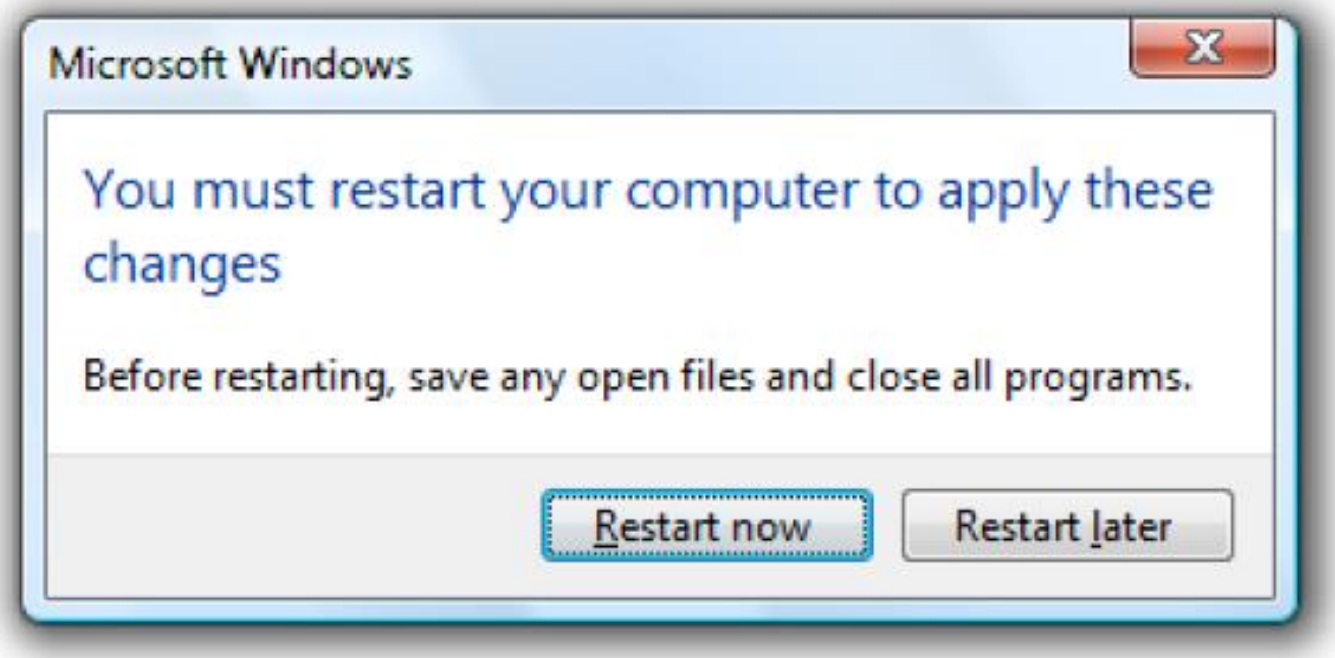
Do not add a number to the first new window.



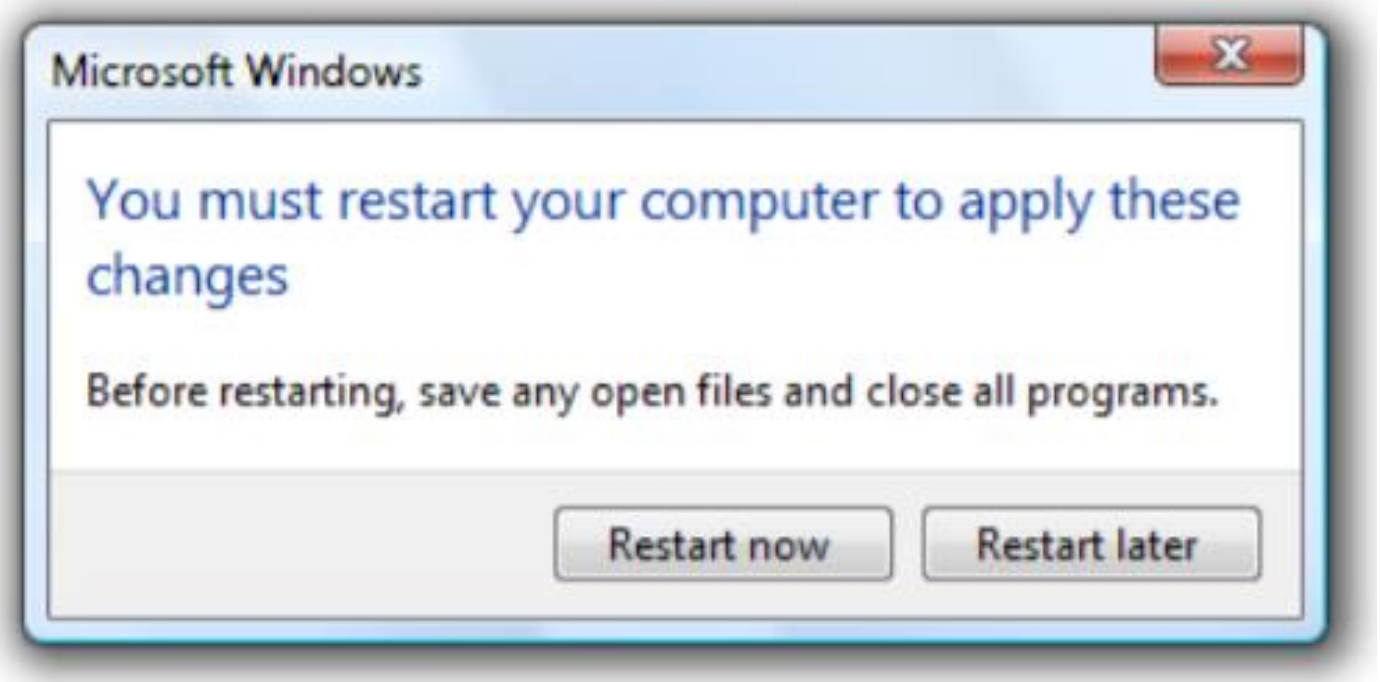
Do not use additional punctuation.

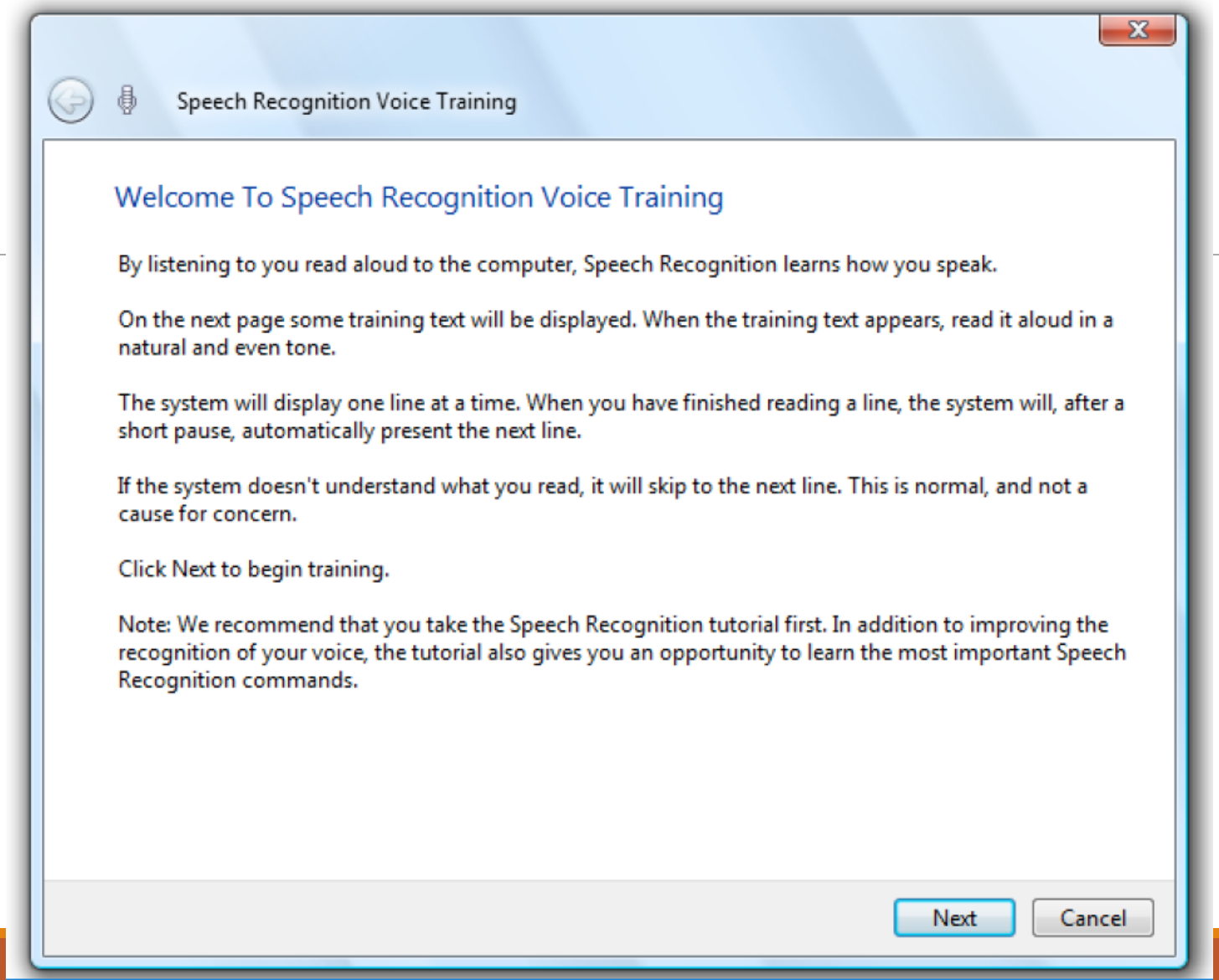
Do not leave title blank.

MS Guidelines

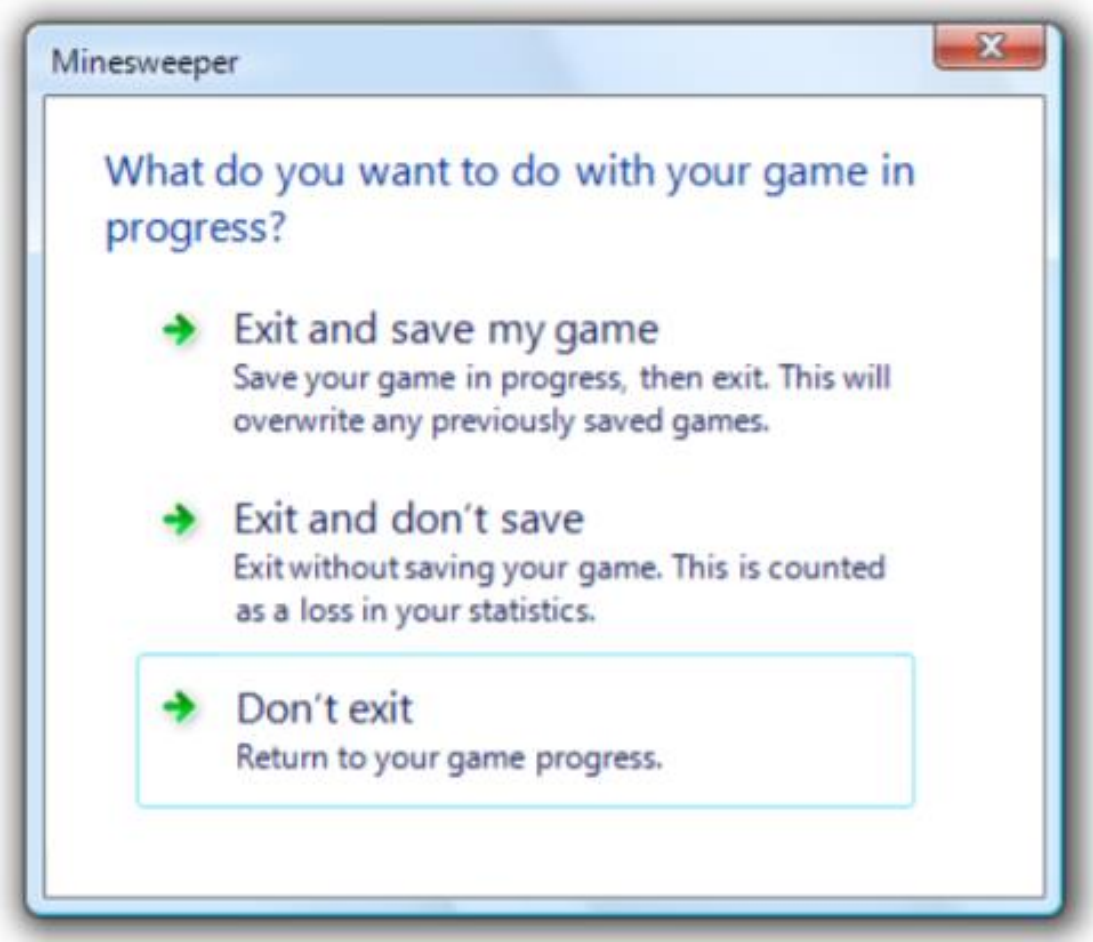


Correct:

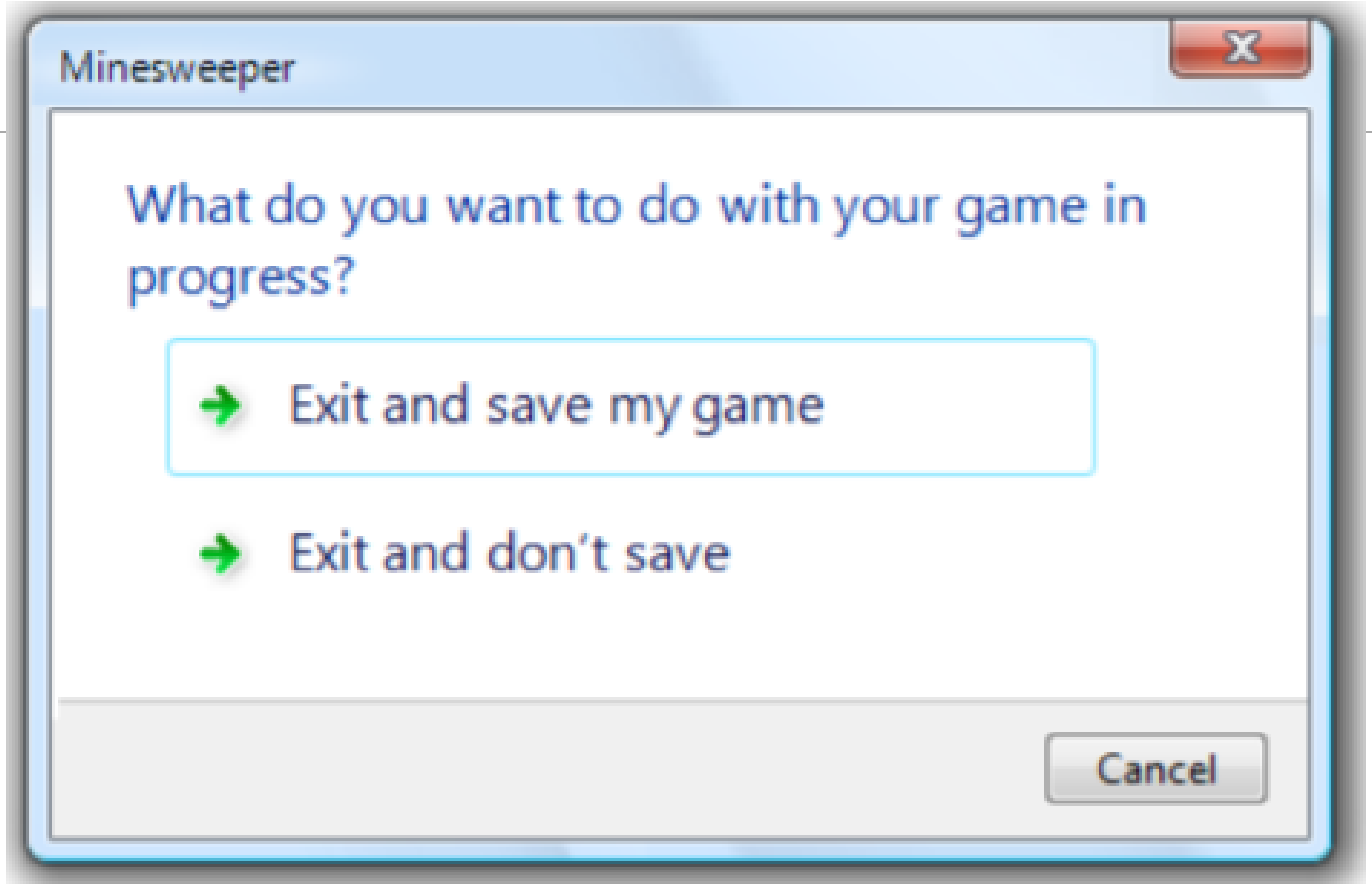

Microsoft Windows
You must restart your computer to apply these changes
Before restarting, save any open files and close all programs.
Restart now
Restart later


Speech Recognition Voice Training
Welcome To Speech Recognition Voice Training
By listening to you read aloud to the computer, Speech Recognition learns how you speak.
On the next page some training text will be displayed. When the training text appears, read it aloud in a natural and even tone.
The system will display one line at a time. When you have finished reading a line, the system will, after a short pause, automatically present the next line.
If the system doesn't understand what you read, it will skip to the next line. This is normal, and not a cause for concern.
Click Next to begin training.
Note: We recommend that you take the Speech Recognition tutorial first. In addition to improving the recognition of your voice, the tutorial also gives you an opportunity to learn the most important Speech Recognition commands.
Next
Cancel

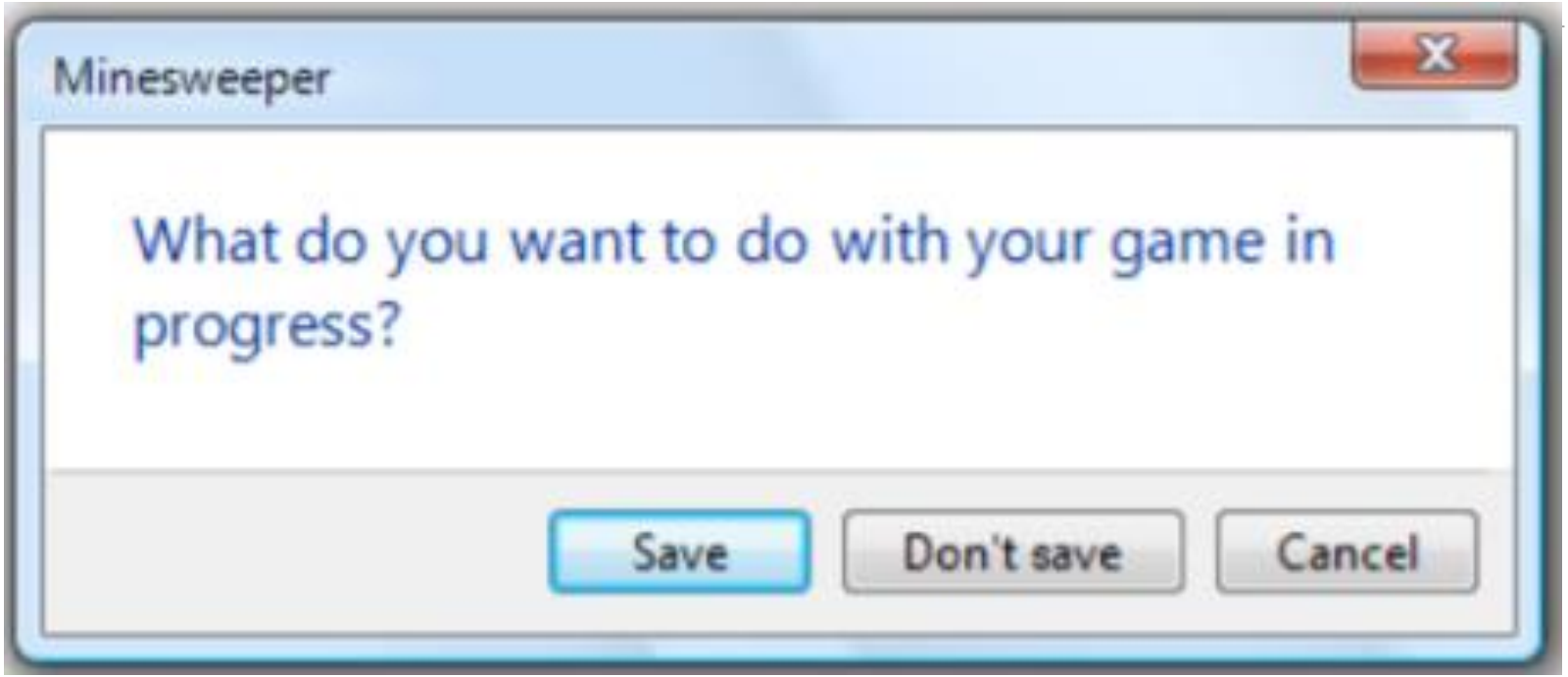
What is Wrong?



Next


Minesweeper
What do you want to do with your game in progress?
Exit and save my game
Exit and don't save
Cancel

Final


Minesweeper
What do you want to do with your game in progress?
Save
Don't save
Cancel

Problems with style guides

- Compliance does not equal usability!
- Guidelines may be inappropriate
- Interpreting and applying is left to designer
- Not always clear what is the basis for a guideline or recommendation

- **Pieces from faces of beautiful women do not make the most beautiful woman face**

Which Style?

2- HCI Guidelines/Principles

- These are general principles of design
- Not tied to a platform or producer
- Explicitly aimed at improving usability

Early HCI Guidelines

- Provide help-facilities (Hansen 1971)
- Ease of use and understanding, (Lewis,1973)
- Informative error message (Kennedy 1974) Consistency (Gaines and Facey 1975)
- Allow user to be in control (Palme, 1975)

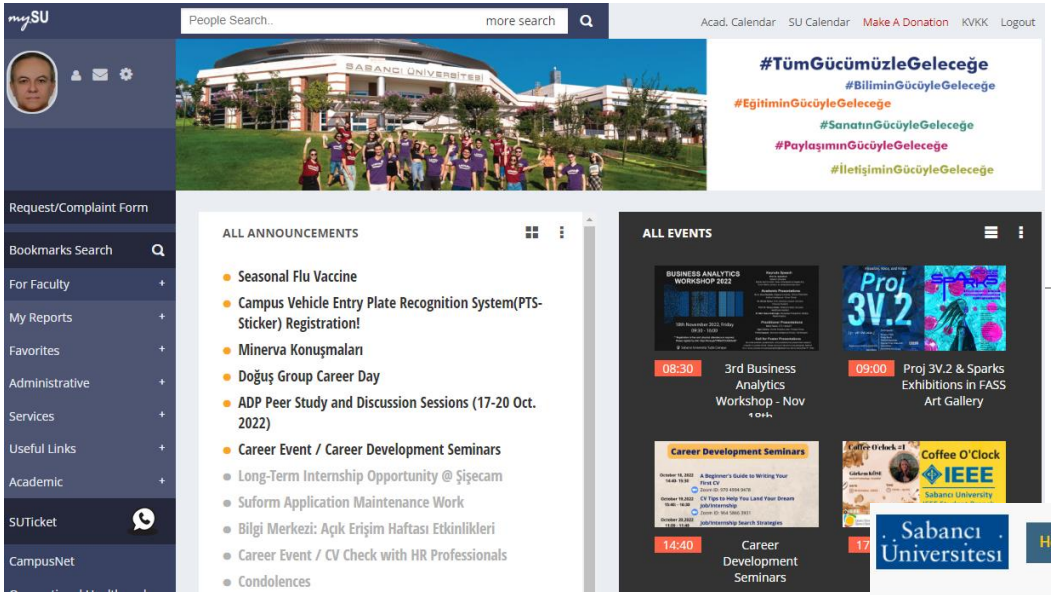
Limitations to all guidelines

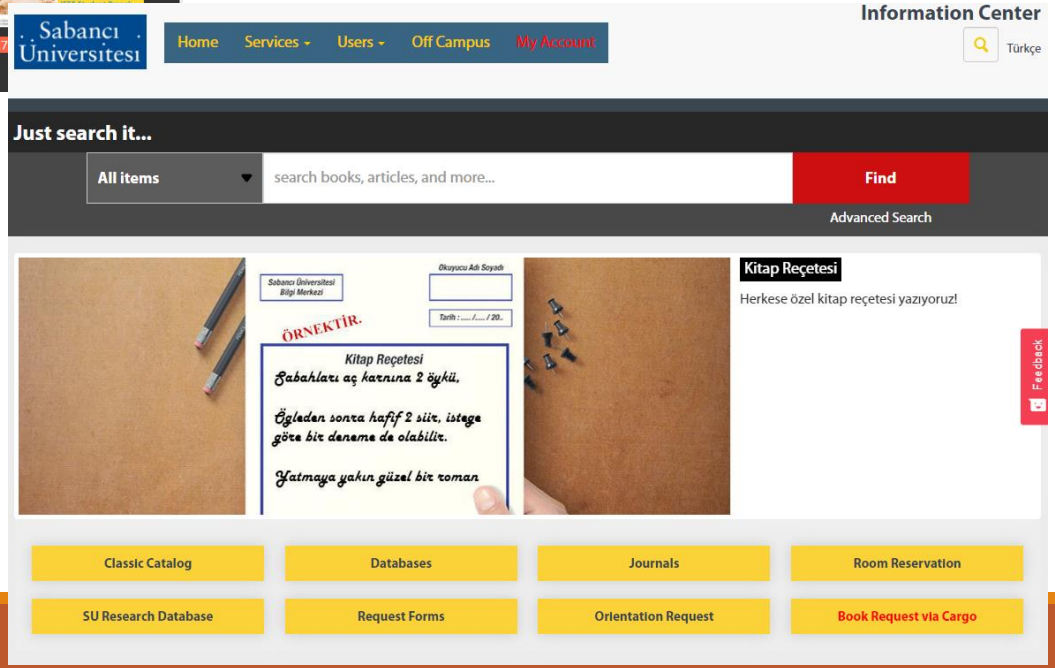
- Too general
  - Be consistent…sure but how?
  - What is feedback anyhow…..a beep?
- Frequently vague
  - How do you design a ‘good’ error message?
- Rarely establish their limits of application
  - What about user development?

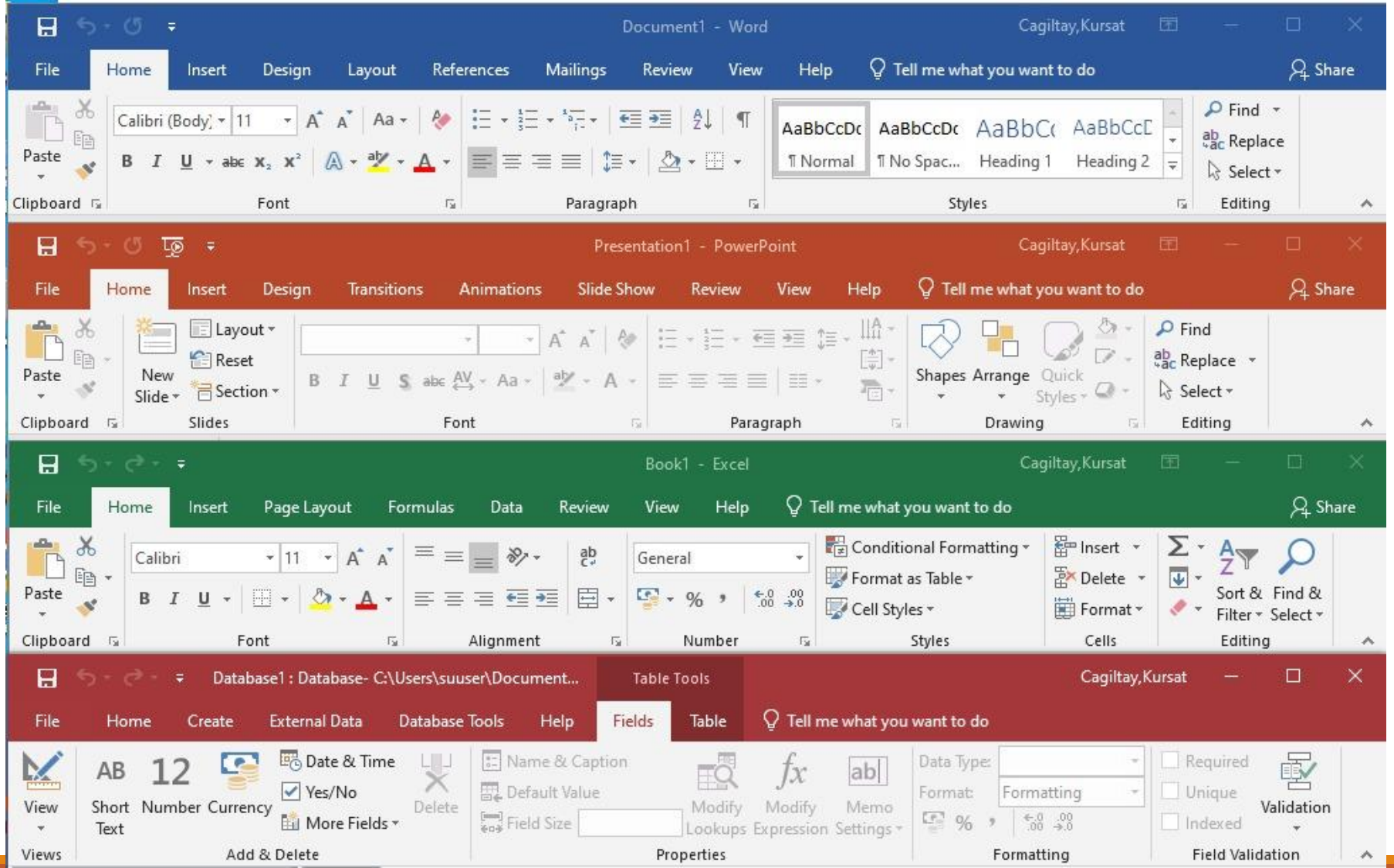
For Example: Be Consistent

- Three types of consistency
  - Internal to the application
  - External to other applications
  - Correspondance to the world

- Which should we design for?


mySU
People Search..
more search
Acad. Calendar
SU Calendar
Make A Donation
KVKK
Logout
#TümGücümüzleGeleceğe
#BiliminGücüyleGeleceğe
#EğitiminGücüyleGeleceğe
#SanatınGücüyleGeleceğe
#PaylaşımınGücüyleGeleceğe
#İletişiminGücüyleGeleceğe
Request/Complaint Form
Bookmarks Search
For Faculty
My Reports
Favorites
Administrative
Services
Useful Links
Academic
SUTicket
CampusNet
ALL ANNOUNCEMENTS
Seasonal Flu Vaccine
Campus Vehicle Entry Plate Recognition System(PTS-Sticker) Registration!
Minerva Konuşmaları
Doğuş Group Career Day
ADP Peer Study and Discussion Sessions (17-20 Oct. 2022)
Career Event / Career Development Seminars
Long-Term Internship Opportunity @ Şişecam
Suform Application Maintenance Work
Bilgi Merkezi: Açık Erişim Haftası Etkinlikleri
Career Event / CV Check with HR Professionals
Condolences
ALL EVENTS
08:30
3rd Business Analytics Workshop - Nov
09:00
Proj 3V.2 & Sparks Exhibitions in FASS Art Gallery
Career Development Seminars
14:40
Career Development Seminars
Coffee O'Clock
IEEE
Sabancı University


Sabancı Üniversitesi
Home
Services
Users
Off Campus
My Account
Information Center
Türkçe
Just search it...
All items
search books, articles, and more...
Find
Advanced Search
Kitap Reçetesi
Herkese özel kitap reçetesi yazıyoruz!
Sabancı Üniversitesi Bilgi Merkezi
Okuyucu Adı Soyadı
ÖRNEKTİR.
Kitap Reçetesi
Sabahları aç karnına 2 öykü,
Öğleden sonra hafif 2 şiir, istege göre bir deneme de olabilir.
Yatmaya yakın güzel bir roman
Classic Catalog
Databases
Journals
Room Reservation
SU Research Database
Request Forms
Orientation Request
Book Request via Cargo
Feedback


Document1 - Word
Cagiltay,Kursat
File Home Insert Design Layout References Mailings Review View Help Tell me what you want to do Share
Paste Calibri (Body) 11 Aa
Clipboard Font Paragraph Styles Editing
AaBbCcDc ¶ Normal
AaBbCcDc ¶ No Spac...
AaBbC Heading 1
AaBbCcE Heading 2
Find Replace Select
Presentation1 - PowerPoint
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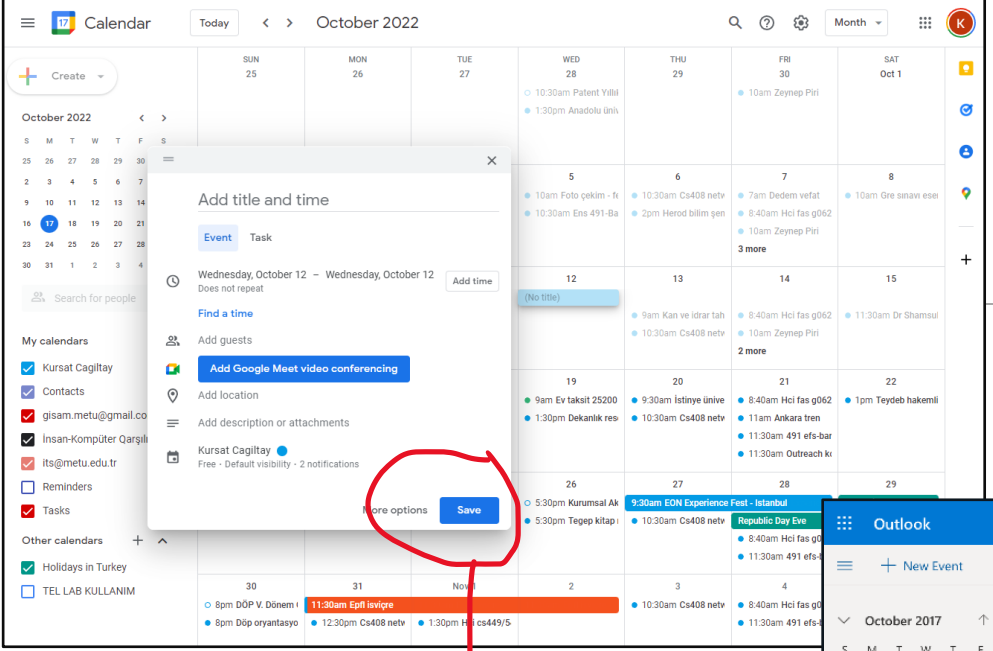
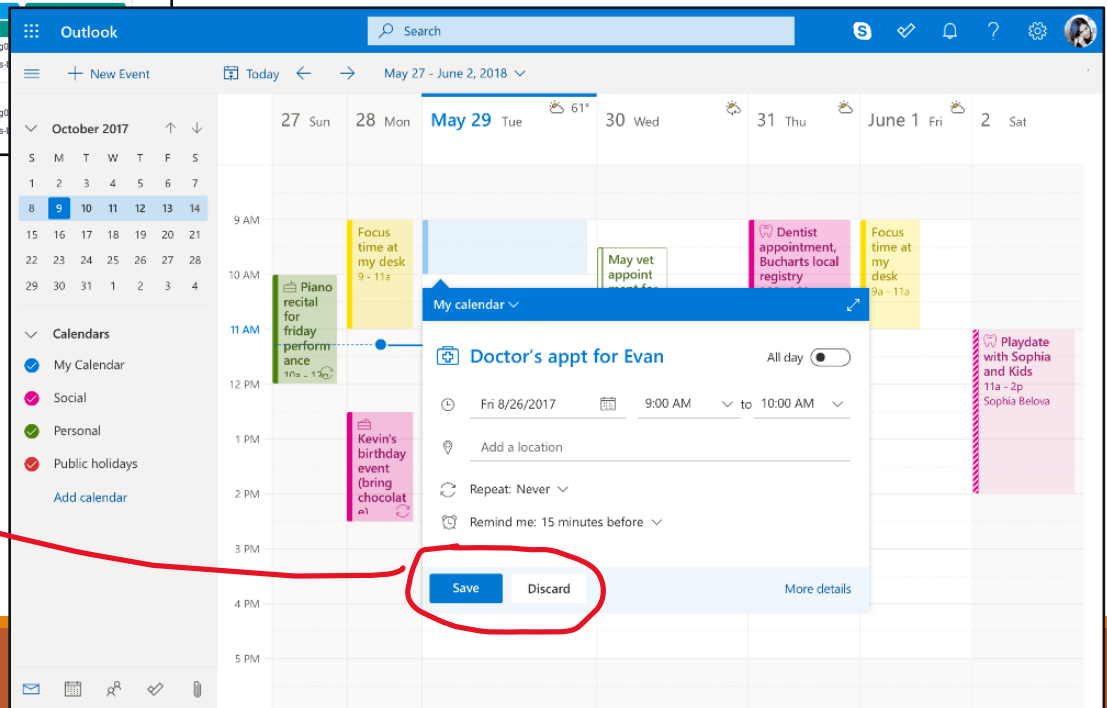
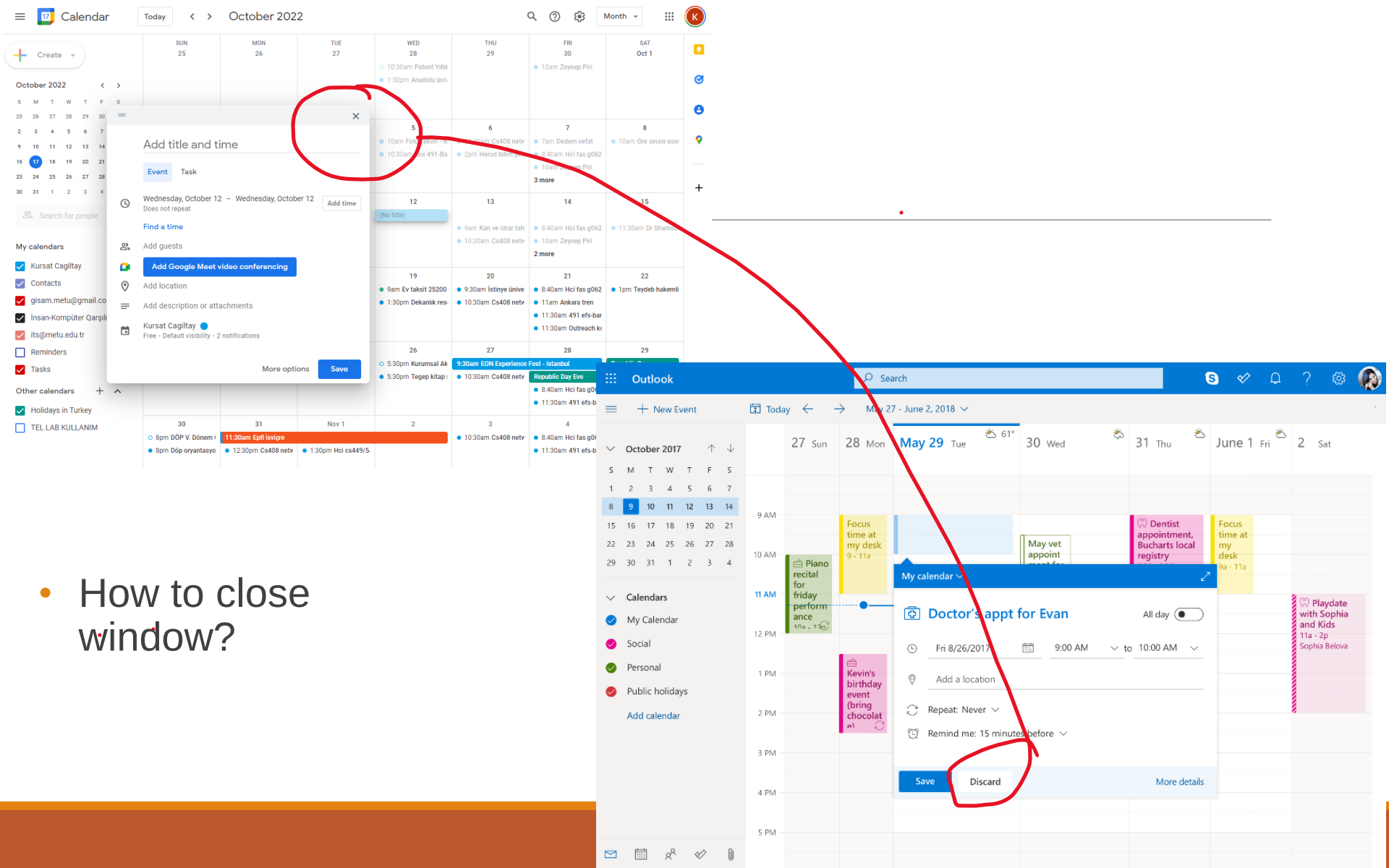
Paste New Slide Layout Reset Section
Clipboard Slides Font Paragraph Drawing Editing
Shapes Arrange Quick Styles
Find Replace Select
Book1 - Excel
Cagiltay,Kursat
File Home Insert Page Layout Formulas Data Review View Help Tell me what you want to do Share
Paste Calibri 11
Clipboard Font Alignment Number Styles Cells Editing
General
Conditional Formatting
Format as Table
Cell Styles
Insert Delete Format
Sort & Filter Find & Select
Database1 : Database- C:\Users\suuser\Document...
Table Tools
Cagiltay,Kursat
File Home Create External Data Database Tools Help Fields Table Tell me what you want to do
View
Short Text
Number
Currency
Date & Time
Yes/No
More Fields
Delete
Name & Caption
Default Value
Field Size
Modify Lookups
Modify Expression
Memo Settings
Data Type:
Format:
Formatting
Required
Unique
Indexed
Validation
Views Add & Delete Properties Formatting Field Validation

Other Apps?

- Google Calendar vs MS Outlook
- Save button?

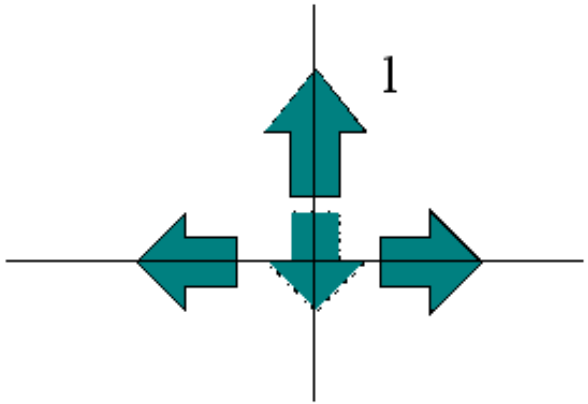


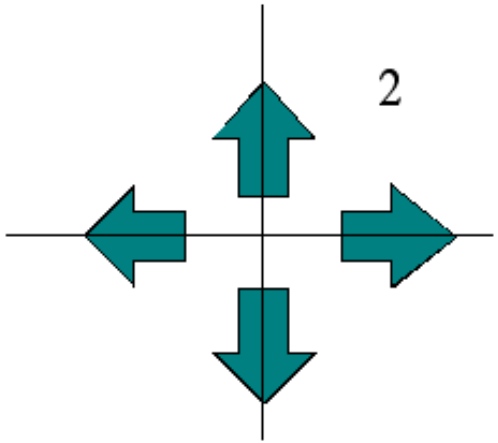


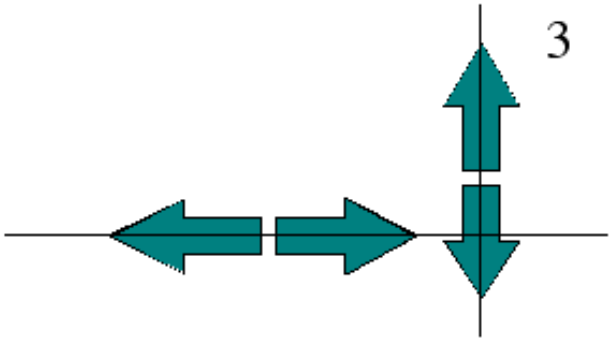


- How to close window?

Which cursor key layout is best?







Why?

Empirical Approach

- Derives principles from evidence
- Manipulates interface variables experimentally and observes effects
- Seeks to derive laws of interaction
- Seeks to verify all claims for good design

- how to better design interfaces based on experimental findings (Shneiderman)

Reading from Screen or Paper?

- Typical screen reading is 20% slower than paper
- People read from screen readers complain fatigue
- Comprehension and navigation problems

- What is the cause? Does it change according to
  - Age?
  - Technology? Tablet vs Kindle vs Phone

- There is no significant difference between reading from paper versus tablet screen.

- But,

International Eastern Conference on Human-Computer Interaction (IECHCI2022) https://www.iechci.info/

Analyzing usability of screen and paper on reading: an eye tracking study

Gorkem Muyan
Department of Computer Education and Instructional Technology
Middle East Technical University
Ankara, Turkey
gorkem.muyan@metu.edu.tr

Research Asst. Alpay Karagoz
Human-Computer Interaction Laboratory, Computer Center
Middle East Technical University
Ankara, Turkey
akaragoz@metu.edu.tr

Prof. Dr. Kursat Cagiltay
Department of Computer Education and Instructional Technology
Middle East Technical University
Ankara, Turkey
kursat@metu.edu.tr

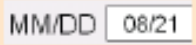
***Abstract*—This study aims to examine whether misspelled types of text affect eye behavior while reading from paper and tablet screens. In addition, this study tests that participants tend to look at which sides of the print and screen while reading. The stimulus material that is used does not include any number, statistic symbol, or calculations. That is why Tobii X2-60 eye tracker device is used to record gaze movements. Tobii Studio Software 3.4.8 version is used to analyze gaze data and show findings in gaze plots and heat maps. The data were collected in laboratory settings. Participants were not informed about errors in stimulus material. The study aims to observe participants' gaze reflex and behavior whether realizing a misspelled word. In the experiment, participants read from paper and tablet respectively, which is Experiment.1 of this study.**

Keywords: Eye movement, Reading behavior, Misspelled words

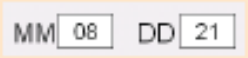
Which One? How do we decide?

An example of progression toward more direct manipulation: less recall/more recognition, fewer keystrokes/fewer clicks, less capability to make errors, and more visible context.

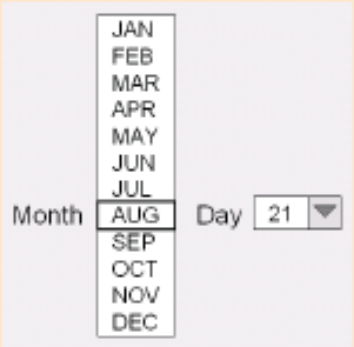
a. Command line



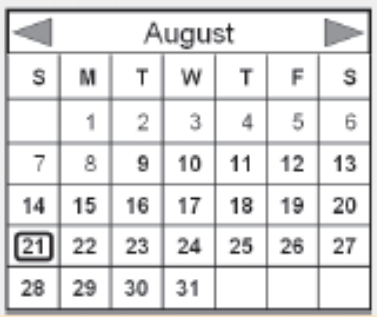
b. Form fill-in to reduce typing



c. Improved form fill-in to clarify and reduce errors



d. Pull-down menus offer meaningful names and eliminate invalid values

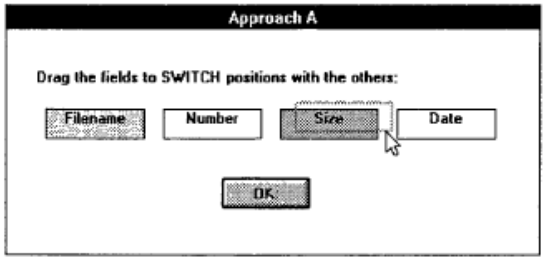


e. 2-D menus to provide context, show valid dates, and enable rapid single selection

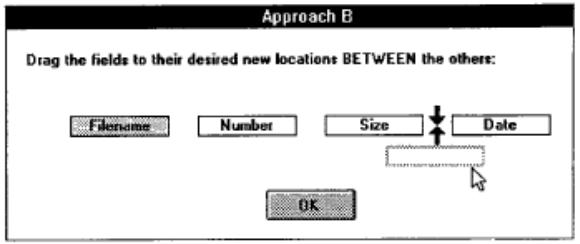
Comparison of data re-ordering feature

Tullis and Kodimer (1992)

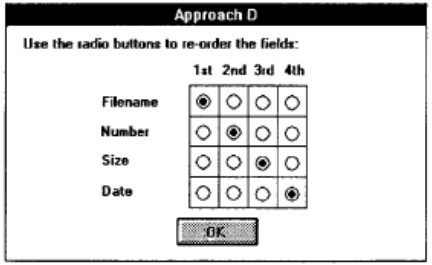
- Drag and drop
- Drag and drop between
- Icons
- Radio buttons
- Menus
- One entry area
- Four entry areas



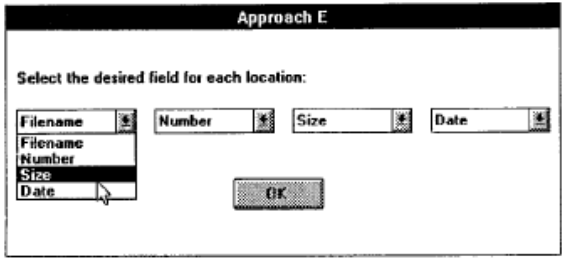
"Drag and Drop On" approach.



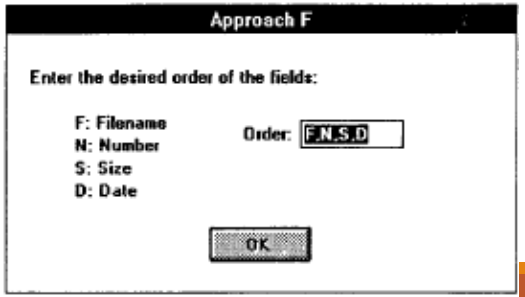
"Drag and Drop Between" approach.



"Radio Buttons" approach.



"Menus" approach.



"One Entry Area" approach.

"Four Entry Areas" approach.

Method

- 15 users, 12 trials per method
- Changing either 2,3, or 4 fields of data
- Time and accuracy were recorded
- Experimenters determined minimal keystrokes/mouse event required
- User performance compared with prediction

Results

- «Radio buttons» and «One entry area» best
- «Four entry area» worst
- Differences appear when 3 or 4 fields are changed
- No correlation with keystroke/mouse acts
- User satisfaction positively correlated with data

Conclusion (p.270)

- decisions based on guidelines, convention, and intuition **may not** always yield the most effective interface design
- dragging and dropping approaches studied here were **not** among the most effective user interfaces for this particular task.

- Beautiful=Easy to use

- Very high correlations were found between perceived aesthetics of the interface and a priori perceived ease of use of the system

Aesthetics and Apparent Usability: Empirically Assessing Cultural and Methodological Issues

Noam Tractinsky
Industrial Engineering and Management
Ben Gurion University of the Negev
P.O. Box 653, Beer Sheva, 84105, Israel
+972 (7) 647 2226
noamt@bgumail.bgu.ac.il

"... it requires a somewhat mystical theory of aesthetics to find any necessary connection between beauty and function." (Herbert Read, Art and Industry, p.61).

ABSTRACT

Three experiments were conducted to validate and replicate, in a different cultural setting, the results of a study by Kurosu and Kashimura [12] concerning the relationships between users' perceptions of interface aesthetics and usability. The results support the basic findings by Kurosu and Kashimura. Very high correlations were found between perceived aesthetics of the interface and *a priori* perceived ease of use of the system. Differences of magnitude between correlations obtained in Japan and in Israel suggest the existence of cross-cultural differences, but these were not in the hypothesized direction.

perceptual capabilities and limitations has provided fertile ground for formulating principles (e.g., [22]) and guidelines (e.g., [28, 21]) of usable systems. Nielsen [21] defines the *usability* of a computer system in terms of five attributes: Learnability, efficiency, memorability, errors, and satisfaction. In general, the evaluation of system usability requires that these attributes be measured during or after people have actually used the system. Thus, while designers might rely on principles and guidelines to design usable systems, the use of certain inspection methods, if not extensive testing, is required to establish a certain degree of usability. On the other hand, evaluating other determinants of system acceptability may not require such a lengthy process. For example, system cost or likeability can be evaluated relatively simply and quickly. Thus, much effort might be invested by HCI designers in their attempts to evaluate and improve usability whereas, at the same time, other

- degree of system's aesthetics affected the post-use perceptions of both aesthetics and usability

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What is beautiful is usable

N. Tractinsky*, A.S. Katz, D. Ikar

Industrial Engineering and Management, Ben Gurion University of the Negev, Beer Sheva 84105, Israel

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Abstract

An experiment was conducted to test the relationships between users' perceptions of a computerized system's beauty and usability. The experiment used a computerized application as a surrogate for an Automated Teller Machine (ATM). Perceptions were elicited before and after the participants used the system. Pre-experimental measures indicate strong correlations between system's perceived aesthetics and perceived usability. Post-experimental measures indicated that the strong correlation remained intact. A multivariate analysis of covariance revealed that the degree of system's aesthetics affected the post-use perceptions of both aesthetics and usability, whereas the degree of actual usability had no such effect. The results resemble those found by social psychologists regarding the effect of physical attractiveness on the valuation of other personality attributes. The findings stress the importance of studying the aesthetic aspect of human–computer interaction (HCI) design and its relationships to other design dimensions.

Keywords: User interface; Aesthetics; Usability; Apparent usability; HCI design considerations; HCI perceptions

So

- Users respond to interface beauty
- Users do not predict their own performance (process and outcome) accurately
- Designers cannot usefully predict user response through introspection, any current theory of interaction, or asking their colleagues!

- Does apparent usability correlate with experience in use («true» usability)?

- A longer study
- Before use
- After use

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Understanding user preferences based on usability and aesthetics before and after actual use

Sangwon Lee [a,*], Richard J. Koubek [b,1]

[a] The Harold and Inge Marcus Department of Industrial and Manufacturing Engineering, The Pennsylvania State University, 343 Leonhard Building, University Park, PA 16802, USA
[b] College of Engineering, The Louisiana State University, 3304 Patrick F. Taylor Hall, Baton Rouge, LA 70803, USA

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ABSTRACT

Designing a highly preferred product or system is a crucial issue for better information-services and product sales. We attempted to understand the process of users' preference-making based on usability and aesthetics. In the present study, we examined the relationships among usability/aesthetics features, perceived usability/aesthetics, and user preference through an experiment using four simulated systems with different levels of usability and aesthetics. The results showed that, before actual use, user preference was significantly affected by the differences in aesthetics but marginally affected by the differences in usability. On the other hand, after actual use, user preference was significantly influenced by the differences in both usability and aesthetics. Regardless of the occurrence of actual use, user preference was highly correlated with both perceived usability and perceived aesthetics, which were strongly interrelated. Finally, actual use had a significant effect on perceived usability, perceived aesthetics, and user preference. The findings emphasize the importance of considering both perceived usability and perceived aesthetics. They also demonstrate the need for discriminating users' interactions before and after actual use, in developing a more preferable computer-based application.

Interesting Results

- users' interactions **before actual use**, user preference was **significantly** affected by the aesthetics factor but marginally affected by the usability factor.
- On the other hand, in users' responses **after actual use**, user preference was significantly influenced by **both the usability and the aesthetics** factors.
- Overall, a strong interrelationship between **perceived usability and perceived aesthetics**, as well as high correlations between perceived usability/aesthetics and user preference were found, irrespective of the occurrence of actual use.
- However, in the low usability and the low aesthetics conditions, perceived usability and perceived aesthetics after actual use were in a relatively low correlation.

- visually appealing websites rated more secure
- enter sensitive information into visually appealing websites—
- users rely on visual appeal when making security and trust decisions on websites

Recent Study

ACM Transactions on Privacy and Security

What is Beautiful is Secure

MILICA STOJMENOVIĆ and ERIC SPERO, Carleton University, Canada
MILOŠ STOJMENOVIĆ, Singidunum University, Serbia
ROBERT BIDDLE, Carleton University, Canada

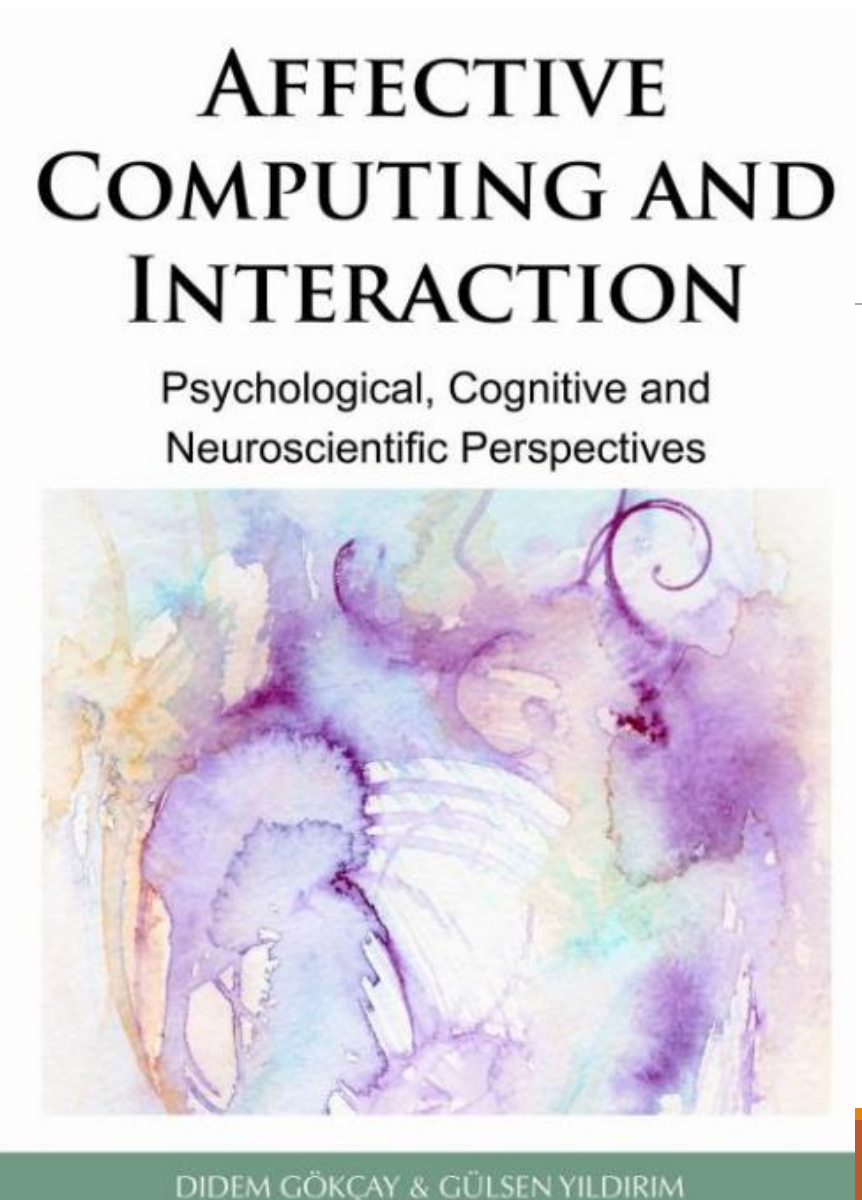
Visual appeal has been shown to influence perceptions of usability and credibility, and we hypothesize that something similar is happening with user judgments of website security: *What is beautiful is secure*. Web certificates provide reliable information about a website's level of security, presented in browser interfaces. Users should use this to inform their trust decisions online, but evidence from laboratory studies and real-world usage suggests that they do not. We conducted two studies—one in lab, and one online—in which participants view and interact with websites with high and low visual appeal, and various security levels, and then make security-related judgments. In both studies, participants consistently rated visually appealing websites as more secure, and indicated they would be more likely to enter sensitive information into visually appealing websites—even when they were less secure. Our results provide evidence that users rely on visual appeal when making security and trust decisions on websites. We discuss how these results may be used to help users.

So,

- Single test is not enough – doesn’t explain everything
- People change in time
- Don’t just assume, test, test, test
- Context is important

- Luckily, we have new tools to measure objectively...


mit
media
lab
affective
computing
Advancing human wellbeing by developing new ways to communicate, understand, and respond to emotion
MIT Media Lab
Research



Chapter 14

Bringing Affect to Human Computer Interaction

Mahir Akgün
Pennsylvania State University, USA

Göknur Kaplan Akıllı
Middle East Technical University, Turkey

Kürşat Çağıltay
Middle East Technical University, Turkey

For full text book
https://ocw.metu.edu.tr/course/view.php?id=230

For Friday read Fitts's Law

Week-3 (15-21) What is a good user interface Guidelines Styles and Evidence

Week-3 Fitts's Law

Chapter in Laws of UX by Jon Yablonski, April 2020. O'Reilly Media

Week-3 Data Entry Comparison Study

Tullis, T.S. & Kodimer, M.L. (1992). A COMPARISON OF DIRECT-MANIPULATION, SELECTION, AND DATA-ENTRY TECHNIQUES FOR REORDERING FIELDS IN A TABLE. PROCEEDINGS of the HUMAN FACTORS SOCIETY 36th ANNUAL MEETING. pp. 298-302

Week-3 (Focus on Discussion section) Understanding user preferences based on usability and aesthetics

Sangwon Lee, Richard J. Koubek, Understanding user preferences based on usability and aesthetics before and after actual use, *Interacting with Computers*, Volume 22, Issue 6, November 2010, Pages 530–543, https://doi.org/10.1016/j.intcom.2010.05.002

Week-3 (Skim Through) Research-Based Web Design & Usability Guidelines

Leavitt, M. O., Shneiderman, B., Bailey, R. W., Barnum, C., Bosley, J., Chaparro, B., Dumas, J., Ivory, M. Y., John, B., Miller-Jacobs, H., Koyani, S. J., Lewis, J. R., Page, S., Ramey, J., Redish, J., Scholtz, J., Wigginton, S., Wolfson, C. A., Wood, L. E., & Zimmerman, D. (2006). Research-Based Web Design & Usability Guidelines [2006 edition].

Week-3 (Skim Through) Microsoft Interface Design Guidelines

User experience guidelines for Universal Windows Platform (UWP) apps