INTERACTION DESIGN

PREECE • ROGERS • SHARP

beyond human-computer interaction
4th Edition

Chapter 5

EMOTIONAL INTERACTION

Overview

- Emotional Interaction
- Emotions and the user experience
- Emotional Design Model By Ortony

- Emotional Design Model By Norman
- v
- Expressive Interfaces

- Friendly Interfaces

- Frustrating and Annoying interface – Error Messages

- Persuasive technologies and behavioural change

Emotions and the user experience

- HCI has traditionally been about designing efficient and effective systems

- Now more about how to design interactive systems that make people respond in certain ways

  - **e.g. to be happy, to be trusting, to learn, to be motivated**

- **Emotional interaction is concerned with how we feel and react when interacting with technologies**

Emotional interaction

Emotional interaction

- Emotional interaction is about considering what makes us happy, sad, annoyed, anxious, frustrated, motivated, distracted and so on and translating this knowledge into different aspects of the user experience, from when we first want something to when we no longer interact with it or need to replace it.

- However, it is not straightforward to achieve as people's moods and feelings are constantly changing.

Activity

- Try to remember the emotions you went through when buying an item online (e.g. computer, mobile phone, flight, vacation)

- How many different emotions did you go through?

Emotional Interaction

Need

Desire/ Anticipation
To Purchase

Joy/ Frustration
of finding more about the item to purchase

Thrill of deciding on a purchase

Shock of how much it costs

Disappointment
that you can not afford it

Annoyance
to decide again

Relief after making the decision again

Thinking again that may be you should bought the other one
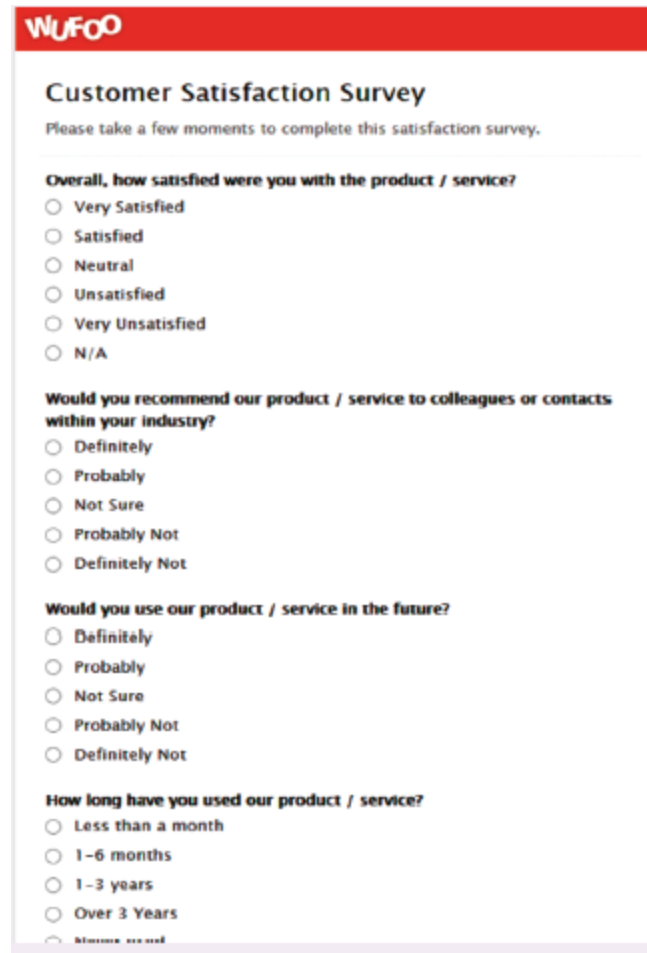
Activity

- Try to remember the emotions you went through when registering for the next semester.

- How many different emotions did you go through?

- Consider the different emotions you experience for a common everyday activity – shopping online for a product, such as a new phone, a flight or a vacation.

- Firstly, there is the realisation of needing or wanting it, and then the desire and anticipation of purchasing it. This is followed by the joy or frustration of finding out more about what products are available and deciding which to choose from potentially hundreds or even thousands (by visiting numerous websites, such as comparison sites, reviews, recommendations, blogs). This entails matching what is available with what you like or need and if you can afford it. The thrill of deciding on a purchase may be quickly followed by the shock of how much it costs and the disappointment that you can't afford it.

- The process of having to decide again may be accompanied by annoyance as you cant find one that is as good as your first choice. You think about other options, such as seeking advice from an expert in a shopping mall, but you have an aversion to sales assistants and don't trust their advice, because you think they have their own interests (making money), rather than yours, at heart. So you carry on looking, getting more tired and frustrated. When you do make a decision you experience a sense of relief. You click merrily though the various options (such as color, size, warranty) and then the dreaded online payment form pops up. You type in all your details and press the final payment button. A window then appears saying that your credit card number is incorrect. So you type it in again very slowly. And you notice you need to type the 3 number security code in again. Finally, when all is done you let out a big sigh. But as you walk away from your computer doubts start to form in your mind – maybe you should have bought the other one...

- This rollercoaster set of emotions is what many of us experience when shopping online, especially for expensive products, where there are a myriad of options to choose from and where we want to be sure that we make the right choice.

Is this form fun to fill in?

Figure 5.1 Examples of Wufoo's online forms
Source: Reproduced with permission from Wufoo.com. http://wufoo.com/examples/#survey.

Is this form fun to fill in?

- **One reason is the way minimalism, balance, and attractiveness, have been used in the design of the forms.**

Customer Satisfaction Survey

Please take a few moments to complete this satisfaction survey.

Overall, how satisfied were you with the product / service?
- ○ Very Satisfied
- ○ Satisfied
- ○ Neutral
- ○ Unsatisfied
- ○ Very Unsatisfied
- ○ N/A

Would you recommend our product / service to colleagues or contacts within your industry?
- ○ Definitely
- ○ Probably
- ○ Not Sure
- ○ Probably Not
- ○ Definitely Not

Would you use our product / service in the future?
- ○ Definitely
- ○ Probably
- ○ Not Sure
- ○ Probably Not
- ○ Definitely Not

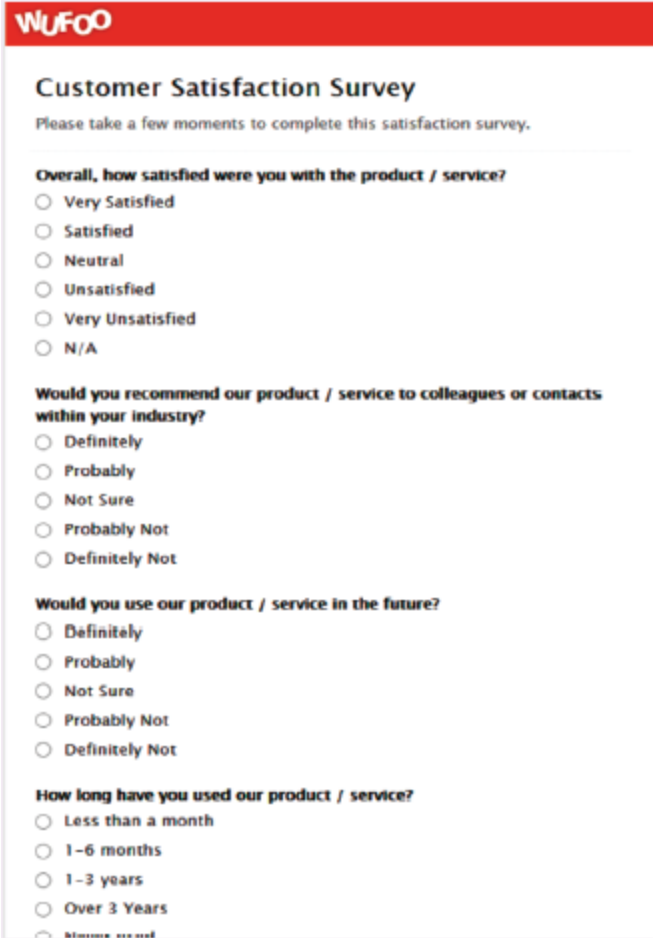**How long have you used our product / service?**
- ○ Less than a month
- ○ 1–6 months
- ○ 1–3 years
- ○ Over 3 Years
- ○ Never used

Figure 5.1 Examples of Wufoo's online forms
Source: Reproduced with permission from Wufoo.com. http://wufoo.com/examples/#survey.

Is this form fun to fill in?

- Wufoo is a company specialising in building online forms and have transformed what are usually boring and tedious tasks into being more fun.

- How do the forms below compare with others you have had to fill in?

- One reason is the way minimalism, balance, attractiveness, and beautifulness have been used in the design of the forms.

Is this form fun to fill in?

- As commented by one of Wufoo's creators, Kevin Hale: "The inspiration for our color palette did come from our competitors. It was really depressing to see so much software designed to remind people they're making databases in a windowless office and so we immediately knew we wanted to go in the opposite direction. My goal was to design Wufoo to feel like something Fisher-Price would make. We were determined to make sure Wufoo was fun."

Emotional design model

- Ortony, Norman, and Revelle (2004) model of emotion
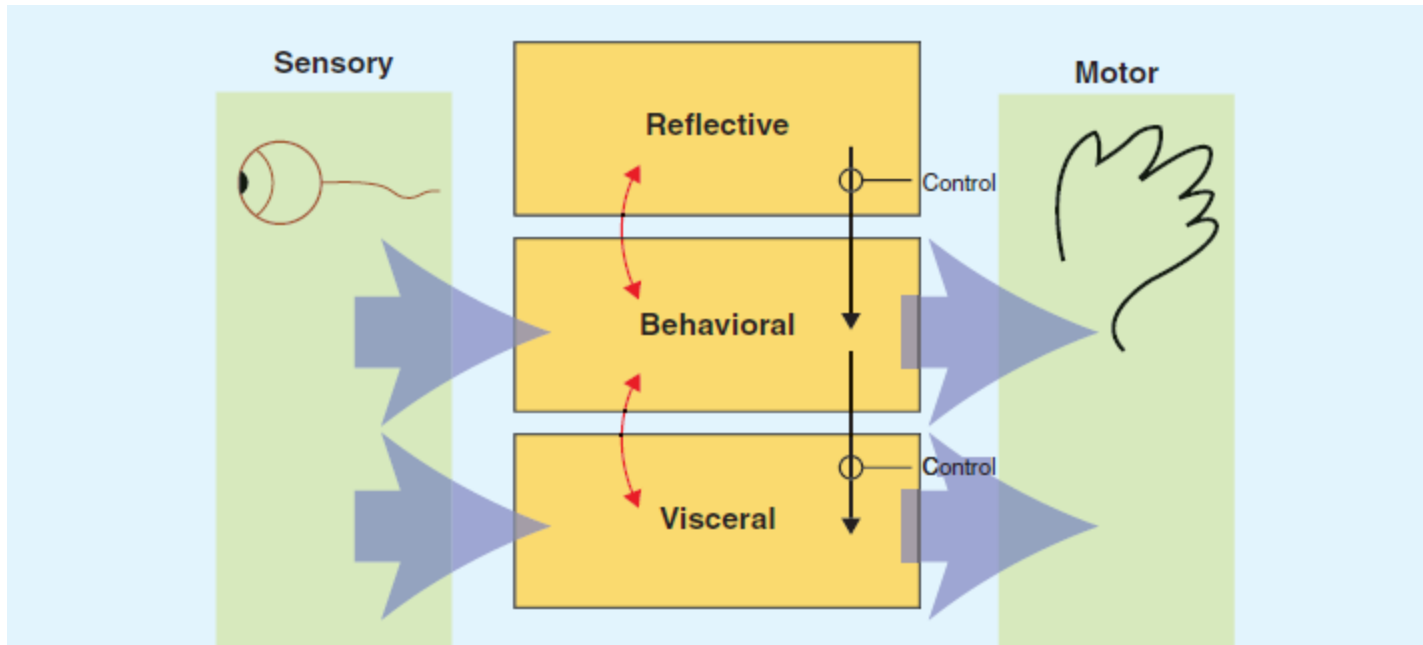
Figure 5.2 Ortony *et al*'s (2005) model of emotional design showing three levels: visceral, behavioral, and reflective

Source: The illustration and text are from Figure 1.1 of Norman, D. A. (2004). *Emotional Design: We love (or hate) everyday things*. New York: Basic Books. Reprinted with permission of the author.

Ortony Emotional Model

- **Ortony model of emotion and behavior is expressed in terms of three different levels:**

  - **Visceral Level: At the lowest level are parts of the brain that are pre-wired to automatically respond to events happening in the physical world.**

  - **Behavioral level: the next level are the brain processes that control out everyday behavior.**

  - **Reflective level: at the highest level are brain processes that contemplate.**

Ortony Emotional Model

- **Visceral design** refers to making product look, feel, and sound good

- **Behavioral design** is about the use and equates with traditional values of usability.

- **Reflective design** taking into account the meaning of personal values of product in a culture.

Activity

- Do you feel more creative when you are in a happy mood?

- Do you get less work done when you are feeling stressed?

Claims from Norman Emotional Design Model

- **1. Attractive things work better.** Norman explains that the affective system works independently of the conscious thoughts, but that both are equally important and extremely related. Decision making that was believed to be a logical, rational process, was proved to be wrong by scientific studies that demonstrated how the affective system influences the decision by giving fast warning of what is good or bad. Moreover, research also showed that when people are relaxed and happy, they become more creative and more imaginative in problem solving situations. Attractive things work better because they make people feel good, thus people are more tolerant of minor difficulties and they think more creatively. Plus, they are willing to work harder to find the solution to what they are trying to do.

- http://alikathe.com/2012/01/22/notes-on-donald-normans-book-emotional-design-why-we-love-or-hate-everyday-things/

Claims from:
Norman Emotional Design Model

- Our emotional state changes how we think

  - when frightened or angry we focus narrowly and body responds by tensing muscles and sweating

    - **more likely to be less tolerant**

  - when happy we are less focused and the body relaxes

    - **more likely to overlook minor problems and be more creative**
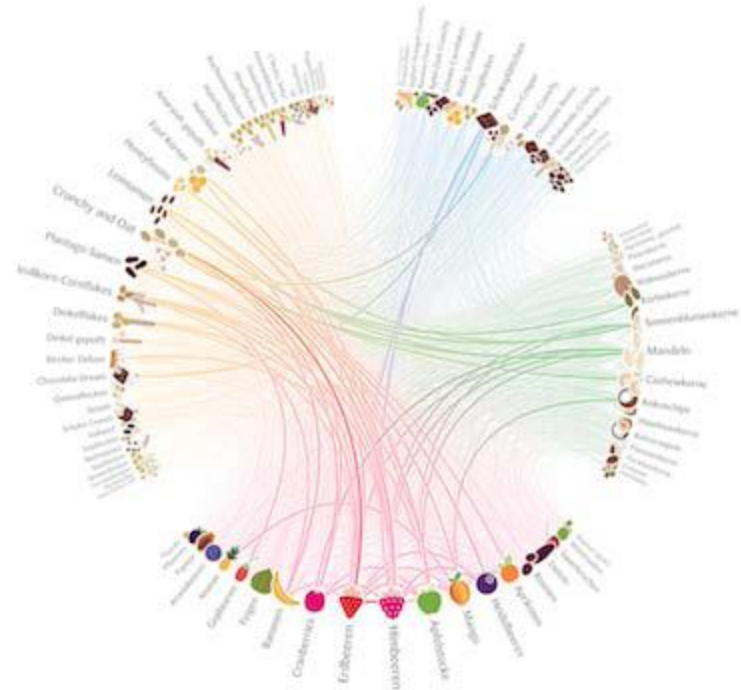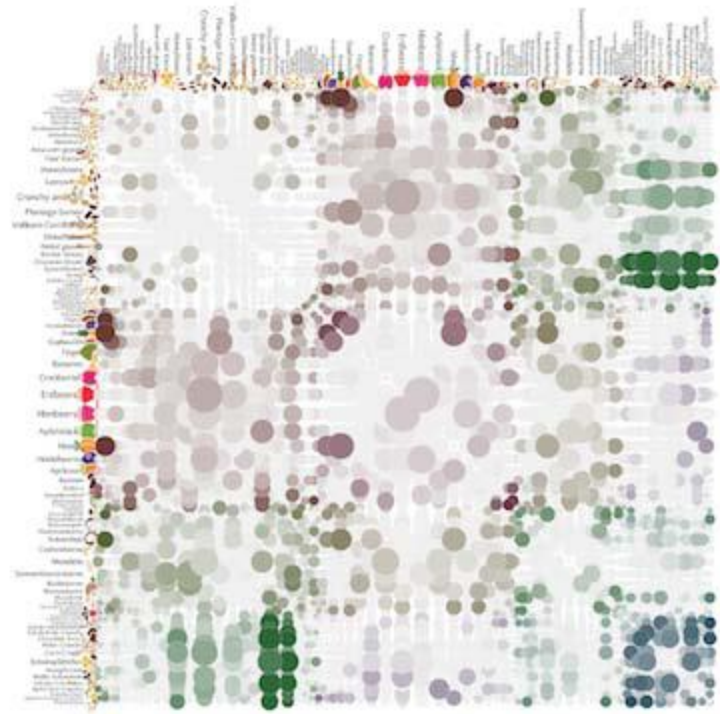
Images from "Müsli Ingredient Network"
(http://moritz.stefaner.eu/projects/musliingredient-network/), created
by Moritz Stefaner for mymuesli (http://mymuesli.com)

Expressive interfaces

- Provide reassuring feedback that can be both informative and fun.

- But can also be intrusive, causing people to get annoyed and even angry

Expressive interfaces

- Expressive forms:
- emoticons (group of keyboard characters as :-) that represents a facial expression or emotions)
- Color,
- icons,
- sounds,
- graphical elements and animations are used to make the 'look and feel' of an interface appealing

Expressive interfaces

- Expressive forms used in the interface to:
  - conveys an emotional state
  - Bring out certain kinds of emotional responses in users such as feeling at ease, comfort, or happiness
- appealing and attractive
- affect usability
- In turn this can affect the usability of an interface
  - people are prepared to put up with certain aspects of an interface (e.g. slow download rate) if the end result is appealing and attractive

Examples of Expressive Interfaces

- Icons and animations have been used to indicate the current state of computer or phone.

Examples of Expressive Interfaces
Mac Happy and Sad Icons
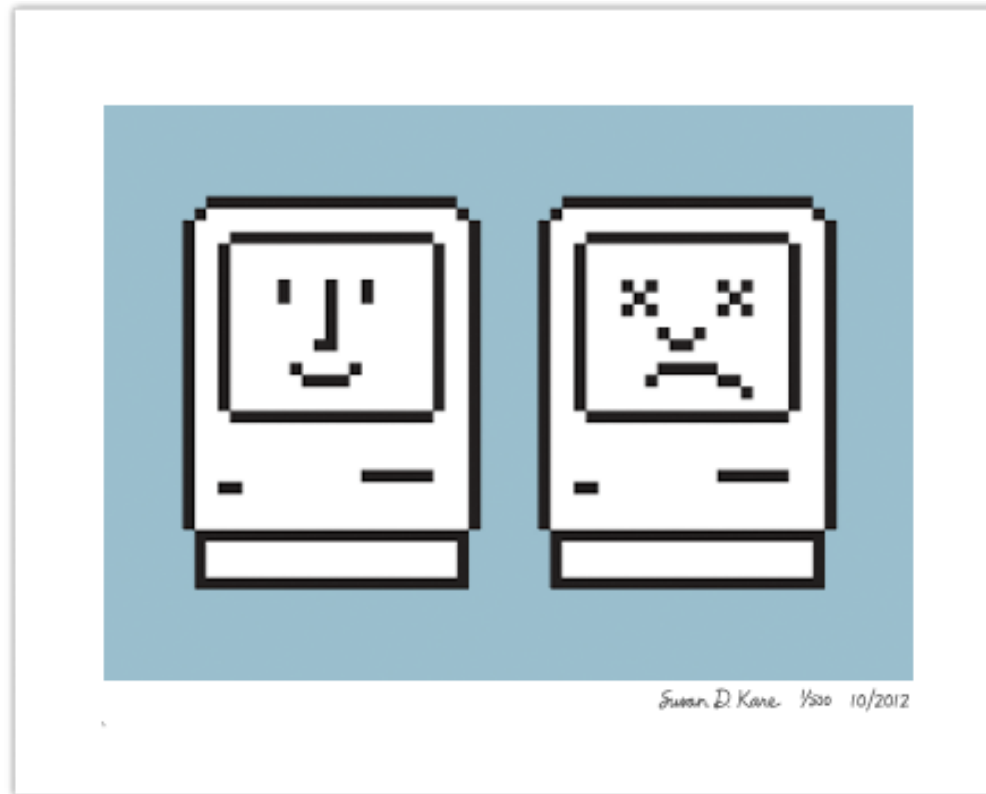
Examples of Expressive Interfaces
Mac Happy and Sad Icons

Examples of Expressive Interfaces

- **Example: Mac Happy and Sad Icon designed by Chief Mac iconist Susan Kare 1983. The Happy Mac icon showed that booting had begun successfully. It didn't need to smile but the fact that it did added a little warmth into your day – unless you were desperately trying to reboot a Mac time after time to fix it, where the smiley face became one you wanted to punch, or at least flick with your frustrated finger.**

Examples of Expressive Interfaces

- **Other ways of conveying the status of a system are through the use of:**
  - **Dynamic icons (recycle bin expanding when a file placed in)**
  - **Animation (mac beach ball whirling to say computer is busy).**
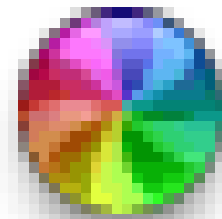
Examples of Expressive Interfaces

- **Other ways of conveying the status of a system are through the use of:**
  - **Spoken messages using various kinds of voices, telling the user what need to be done.**
  - **Sonifications (the use of non-speech audio to convey information). e.g. whoosh for window closing, schlook for a file being dragged, ding for a new email arriving.**
  - **Vibrotactic feedback such as smartphone/smart watch buzzes that represents messages.**

Expressive Interfaces

- **Interfaces that look attractive and appealing conveys an emotional state : happy, more engaging, more enjoyable (user experience)**

- **Interface style in terms of shapes, fonts, colors, white space and graphical elements that are used and the way they are combined can influence its emotional impact.**

- **Use of imagery in an interface can result in more enjoyable and engaging interface.**

- **The use of aesthetic techniques such as clean lines, balance, simplicity, and texture. IPod is an example.**

Friendly interfaces

- Microsoft pioneered friendly interfaces for technophobes - 'At home with Bob' software

- 3D metaphors based on familiar places (e.g. living rooms)

- Agents of pets (e.g. bunny, dog) were included to talk to the user.

  - Make users feel more at ease and comfortable

Bob

Figure 5.6 'At home with Bob' software developed for Windows 95. Although now defunct, it has been resurrected affectionately to run on a Virtual PC platform

Source: Microsoft product screenshot reproduced with permission from Microsoft Corporation.

Clippy

- Why was Clippy disliked by so many?

- Was it annoying, distracting, patronising or other?

- What sort of user liked Clippy?

It looks like you're writing a letter.

Would you like help?

- Get help with writing the letter

- Just type the letter without help

☐ Don't show me this tip again
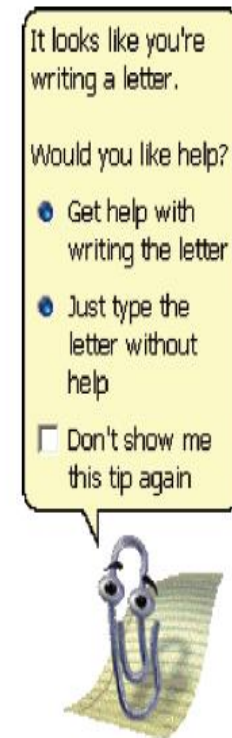
Figure 5.7 Microsoft's agent Clippy

Source: Microsoft product screenshot reproduced with permission from Microsoft Corporation.

Annoying-Frustrating interfaces

- Many causes:
  - When an application does not work properly or crashes
  - When a system does not do what the user wants it to do
  - When a user's expectations are not met
  - When a system does not provide sufficient information to enable the user to know what to do
  - When error messages pop up that are vague, obtuse or condemning
  - When the appearance of an interface is garish, noisy, gimmicky or patronizing
  - When a system requires users to carry out too many steps to perform a task, only to discover a mistake was made earlier and they need to start all over again

Often cases of frustration

- Gimmick (وسيلة للتحايل)
- Error message
- Waiting
- Upgrading

Gimmicks

- Gimmick : a method or trick that is used to get people's attention or to sell something

- gimmicks and error messages that are sometimes impossible to comprehend are the things that just frustrate the users.

- Amusing to the designer but not the user, e.g.
  - Clicking on a link to a website only to discover that it is still 'under construction'

This page is under construction...
we have big plans for this page, so
come back often
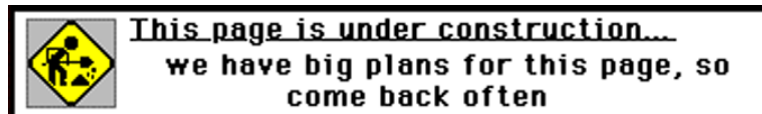
Error messages

- Error messages are a key part of an overall interface design strategy of guidance for the user.

- The strategy should ensure integrated, coordinated error messages that are consistent across one or multiple applications.

- Shneiderman's guidelines for error messages include:

    - **Messages should be specific and precise rather than vague**

    - **Provide context-sensitive help**
    - **avoid using terms like FATAL, INVALID, BAD**

    - **Avoid Audio warnings**

    - **Avoid UPPERCASE and long code numbers**

Guidelines to Prepare Error Messages

1. Specificity: messages that are too general make it difficult for the novice to determine what has gone wrong that cause user frustration. The right amount of specificity is important:

    – **Poor : SYNTAX ERROR**
    – **Better: Unmatched left parenthesis**

    – **Poor: ILLEGAL ENTRY**
    – **Better: Type first letter: Send, Read, or Drop**

    – **Poor: INVALID DATA**
    – **Better: Days range from 1 to 31**

Guidelines to Prepare Error Messages

1. Specificity: messages that are too general make it difficult for the novice to determine what has gone wrong that cause user frustration. The right amount of specificity is important:

- **Poor: BAD FILE NAME**
- **Better: The file C:\demo\data.txt.txt was not found**

- **Poor: in an interface for hotel check-in required the desk clerk to enter 40-45 character string containing the name, room number, credit-card information,.. If the clerk made a data entry error, the only message was INVALID INPUT. It will lead to frustration.**
- **Better: add * to the specific fields containing errors**

Website error messages

Error 404 – Web Page Not Found

Error!

Your login information is incorrect...

Please verify that you typed in your Last Name, NSF ID, and Password correctly. If you still cannot login, please contact the Administrator regarding your access rights.

Return To Previous Page

Figure 5.8 An error message that appears if a user types in his or her personal details for accessing the protected website incorrectly

Guidelines to Prepare Error Messages

2. Constructive Guidance and Positive Tone

- – **Rather than criticize users for what they have done wrong, messages should indicate what users need to do to set things right.**

Guidelines to Prepare Error Messages

2. Constructive Guidance and Positive Tone

- **Poor: Run-Tim error '-214769 (800405)': Method "Profile' of object 'system' failed**
- **Better: Virtual memory space consumed. Close some programs and retry.**

- **Poor: Resource Conflict Bus: 00 Device: 03 Function: 01**
- **Better: Remove your compact flash card and restart**

- **Poor: Network connection refused**
- **Better: Your password was not recognized. Please retype.**

- **Poor: Invalid date.**
- **Better: Drop-off date must come after pickup date.**

Guidelines to Prepare Error Messages

3. User-centred phrasing:

- **User-centred suggests that the user control the interface ,initiating more than responding.**

- **GUI provide ScreenTips, context sensitive help or menu**

Guidelines to Prepare Error Messages

4. Appropriate physical format:

- most users prefer and find it easier to read mixed upper and lower case.
- There is disagreement about the optimal placement of messages in a display:
  - One school of thought argues that the message should be placed in a display near where the problem has arisen.
  - A second opinion is that the messages clutter the display and should be placed in a consistent position on the bottom of the display.
  - The third approach is to display a dialog position on the bottom of the display.
- Sound or bell ring might be embarrassing.

More helpful error message

"The requested page **/helpme** is not available on the web server.

If you followed a link or bookmark to get to this page, please let us know, so that we can fix the problem. Please include the URL of the referring page as well as the URL of the missing page.

Otherwise check that you have typed the address of the web page correctly.

Persuasive technologies and behavioural change

- Persuasive technologies and techniques are now used to change what they do or think

- Techniques are: ?

Persuasive technologies and behavioural change

- Persuasive technologies and techniques are now used to change what they do or think

- Techniques are:
  - **Pop-up ads,**
  - **warning messages,**
  - **reminders,**
  - **prompts,**
  - **personalized messages,**

Persuasive technologies and behavioural change

- **Interactive computing systems deliberately (thought about carefully) designed to change people's attitudes and behaviours (Fogg, 2003)**

Persuasive technologies and behavioural change

- **Examples of Successful Persuasive techniques for commercial purposes:**

  - **Amazon 1-click mechanism that makes it so easy to buy something at their online store.**

  - **Recommender systems that suggest specific books, hotels, restaurants.**

Persuasive technologies and behavioural change

- **There are technologies that try to change people's behaviour in non-commercial domains:**

  – **Healthcare**
  – **Fitness : Happy Fork**
  – **Energy consumption**
  – **Learning.**

- **Emphasis is on changing habits or doing something that will improve individual's well-being through monitoring their behaviour.**

Nintendo's Pocket Pikachu

1998   1999   2001   2009

- **Changing bad habits and improving well being**

    – **Designed to motivate children to be more physically active on a regular basis**

    – **owner of the digital pet that 'lives' in the device is required to walk, run, or jump**

    – **If owner does not exercise the virtual pet becomes angry and refuses to play anymore**

How effective?

- Is the use of novel forms of interactive technologies (e.g., the combination of sensors and dynamically updated information) that monitor, warn, or send personalized messages intermittently to a person more effective at changing a person's behavior than non-interactive methods, such as the placement of warning signs, labels, or ads in prominent positions?

Which is most effective?

Figure 5.11 Stairs versus elevators: static sign versus ambient persuasive displays. Which is most persuasive?

(Continued)

Which is most effective?

- The photo on the left in Figure 5.12 is of a banner placed in downtown LA, in an attempt to encourage the general public to take the stairs instead of the elevator, asking people to climb stairs on a certain day. The two photos on the right are of ambient displays (see also chapter 2) designed to do the same thing but using more subtle and interactive methods: (i) lights that twinkled when people approach them, intended to lure them to take the stairs and (ii) Clouds of different colored spheres that move up and down depending on how many people have taken the stairs or the elevator for a given period of time (grey represents elevator). The higher the orange cloud is relative to the grey one the more people taking the stairs than the elevator (Rogers *et al*, 2010). Which representation do you think is the most effective?

Tracking devices

- Mobile apps designed to help people monitor and change their behaviour (e.g. fitness, sleeping, weight)

- Can compare with online leader boards and charts, to show how they have done in relation to their peers and friends

- Also apps that encourage reflection that in turn increase well-being and happiness

Energy reduction

(a)   (b)

Figure 5.12 (a) The Power Aware Cord consists of an electrical power strip in which the cord is designed to visualize the energy rather than hiding it. Increase and decrease in use is conveyed through showing glowing pulses, flow, and intensity of light. (b) The Waatson (now a commercial product available in many countries) measures in watts or cost how much electricity someone is using in their home at any moment. This is conveyed in LEDs on the top side. On the underside are colored lights: when they glow blue it shows you are using less than normal; when it changes to purple it indicates that your usage is average: and when it is red it indicates you are using more than normal

Source: (a) Photo taken from the Interactive Institute's research program "Static!" and reproduced with permission. (b) Reproduced with permission from DIY Kyoto Ltd. www.diykyoto.com.

The Tidy Street project

- large-scale visualization of the street's electricity usage
  - stenciled display on the road surface using chalk
  - provided realtime feedback that all could see change each day
  - reduced electricity consumption by 15%

Figure 5.13 Looking down at the Tidy Street public electricity graph from a bedroom window

The Tidy Street project

The Tidy Street project

The Tidy Street project

The Tidy Street project

Phishing and trust

- Web used to deceive people into parting with personal details
  - e.g. Paypal, eBay and won the lottery letters

- Allows Internet fraudsters to access their bank accounts and draw money from them

- Many vulnerable people fall for it

- The art of deception is centuries old but internet allows ever more ingenious ways to trick people

Anthropomorphism

- Attributing human-like qualities to inanimate objects (e.g. cars, computers)

- Much exploited in human-computer interaction
  - Make user experience more enjoyable, more motivating, make people feel at ease, reduce anxiety

Which do you prefer?

1. As a welcome message

- "Hello Chris! Nice to see you again. Welcome back. Now what were we doing last time? Oh yes, exercise 5. Let's start again."

- "User 24, commence exercise 5."

Which do you prefer?

2. Feedback when get something wrong

1. *"Now Chris, that's not right. You can do better than that. Try again."*
2. *"Incorrect. Try again."*

Is there a difference as to what you prefer depending on type of message? Why?

Evidence to support anthropomorphism

- Reeves and Naas (1996) found that computers that flatter and praise users in education software programs -> positive impact on them

"Your question makes an important and useful distinction. Great job!"

- Students were more willing to continue with exercises with this kind of feedback

Criticism of anthropomorphism

- Deceptive, make people feel anxious, inferior or stupid

- People tend not to like screen characters that wave their fingers at the user and say:

  - Now Chris, that's not right. You can do better than that.Try again."

- Many prefer the more impersonal:

  - "Incorrect. Try again."

- Studies have shown that personalized feedback is considered to be less honest and makes users feel less responsible for their actions (e.g. Quintanar, 1982)

Summary

- Emotional aspects of interaction design concerned with how to facilitate certain states (e.g. pleasure) or avoid reactions (e.g. frustration)

- Well-designed interfaces can elicit good feelings in people

- Aesthetically pleasing interfaces can be a pleasure to use

- Expressive interfaces can provide reassuring feedback to users

- Badly designed interfaces make people frustrated, annoyed, or angry

- Emotional technologies can be designed to persuade people to change their behaviors or attitudes

- Anthropomorphism is the attribution of human qualities to objects

- Virtual agents and robot pets have been developed to make people feel motivated, reassured, and in a good mood

References

- http://www.cse.chalmers.se/research/group/idc/ituniv/kurser/07/mdi/pdf%20files/Chapter_5.pdf
- Designing the User Interface: Strategies for Effective Human-Computer Interaction, by Shneiderman, Plaisant, Cohen, and Jacobs